FAA Aviation news

SEPTEMBER 1996

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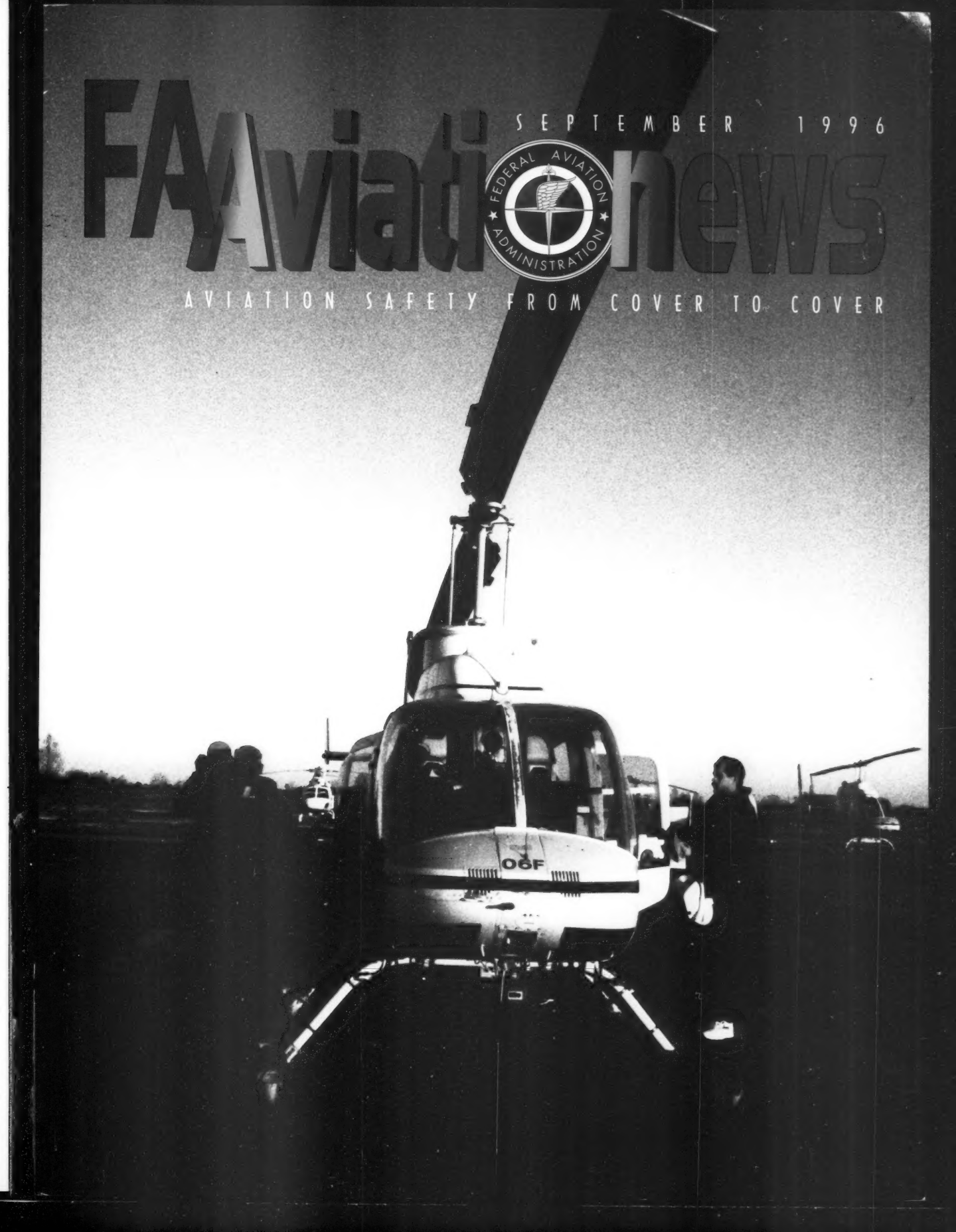

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FAA Aviation news

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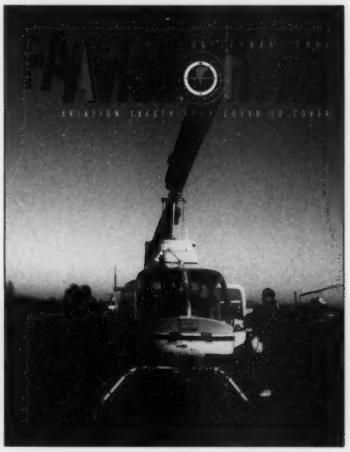

COVER PHOTO: PHI employees prepare for another day of safe operations. See page 20.
(H. Dean Chamberlain photo)

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Aviation Safety Program:
http://www.faa.gov/avr/news/asphome.htm

Amigos en Vuelos

Journey to Mexico s Baja California

by Keith Ballenger and Jacqueline Price

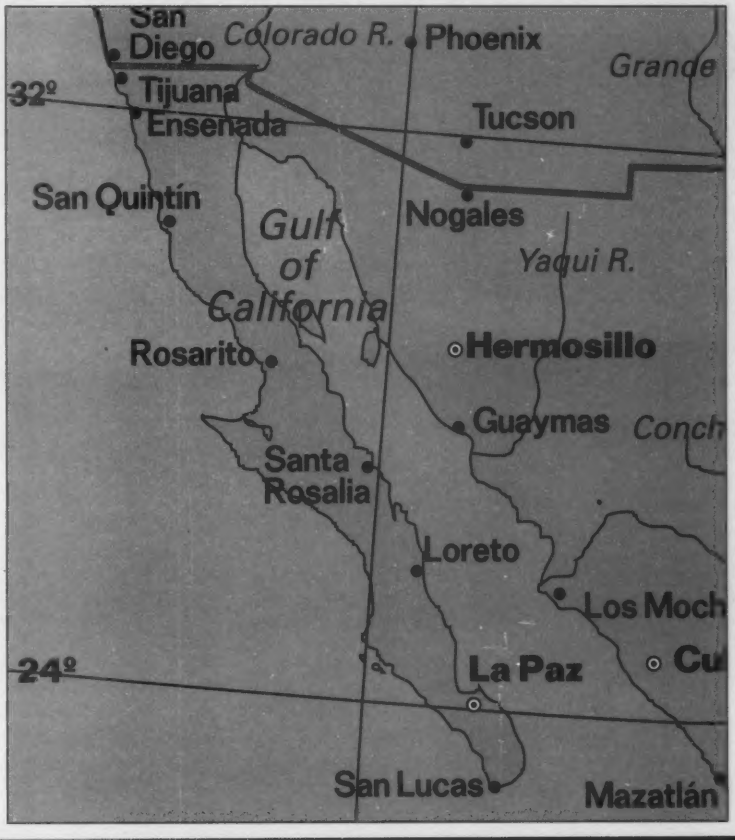
In 1533, an expedition commissioned by Spanish conquistador Hernando Cortez sailed from the Mexican west coast port of Acapulco in the hope of finding a new sea passage to Spain. The sailors left their known world far behind, dreaming of the day they would make their triumphant return. Tragically, the expedition's quest failed. But in its wake, history would record a discovery of far greater significance, that of a vast new, rugged land called "California."

The Spanish fleet had barely set their course of exploration into the uncharted waters of the Pacific Ocean when the crew rose in revolt. Sighting an uncharted shore near the Tropic of Cancer, the renegades dropped anchor in a large, protected bay. They believed that they had discovered the mythical island of California, inhabited by Amazon warriors "carrying weapons of gold." What the mutineers actually discovered was one of the largest peninsulas in the world and rich oyster beds producing rare black pearls. While the existence of the fabled pearls launched the colonization of Baja California, the peninsula's true wealth would not be discovered for another 450 years. Today, the bay of the explorers' anchorage is the city of La Paz, capital of Mexico's 30th state, Baja California del Sur. Though the last of the pearl oysters disappeared in the 1940's, La Paz has prospered as a favorite destination for sport fishing, yachting, and sun worshipers.

From the rich agricultural lands of the Rio Colorado to the sun drenched resort hotels of Los Cabos, Baja California is synonymous with isolation, wilderness, and unparalleled beauty. Stretching nearly 700 nautical miles from the United States border in San Diego to the Cabo San Lucas headlands on its southern tip, the Baja peninsula surpasses both Florida and Italy in size. It encompasses more than 55,000 square miles of primitive mountains and desert, surrounded by over 2,000 miles of the world's most pristine coastline. In fact, Baja California's coast is so large that if it were stretched out straight, it would reach from the subtropical city of Tijuana to just south of Juneau, Alaska.

For generations, the enchantment of the original California has rarely been experienced by anyone other than veteran adventurers and the privileged few who call Baja California their home. But today, its remote unspoiled frontiers are easily accessible from the southwestern United States in only a few short hours by general aviation aircraft.

Whether your journey takes you whale watching in Scammon's Lagoon near Guerrero Negro, fishing for world record marlin off San Jose del Cabo, or visiting the iron church in Santa Rosalia created by the designer of the Eiffel Tower, as with any other flight "not in the vicinity of an airport," it requires thorough cross-country preflight planning. This is especially true in Baja, where flying can be significantly different.



Weather

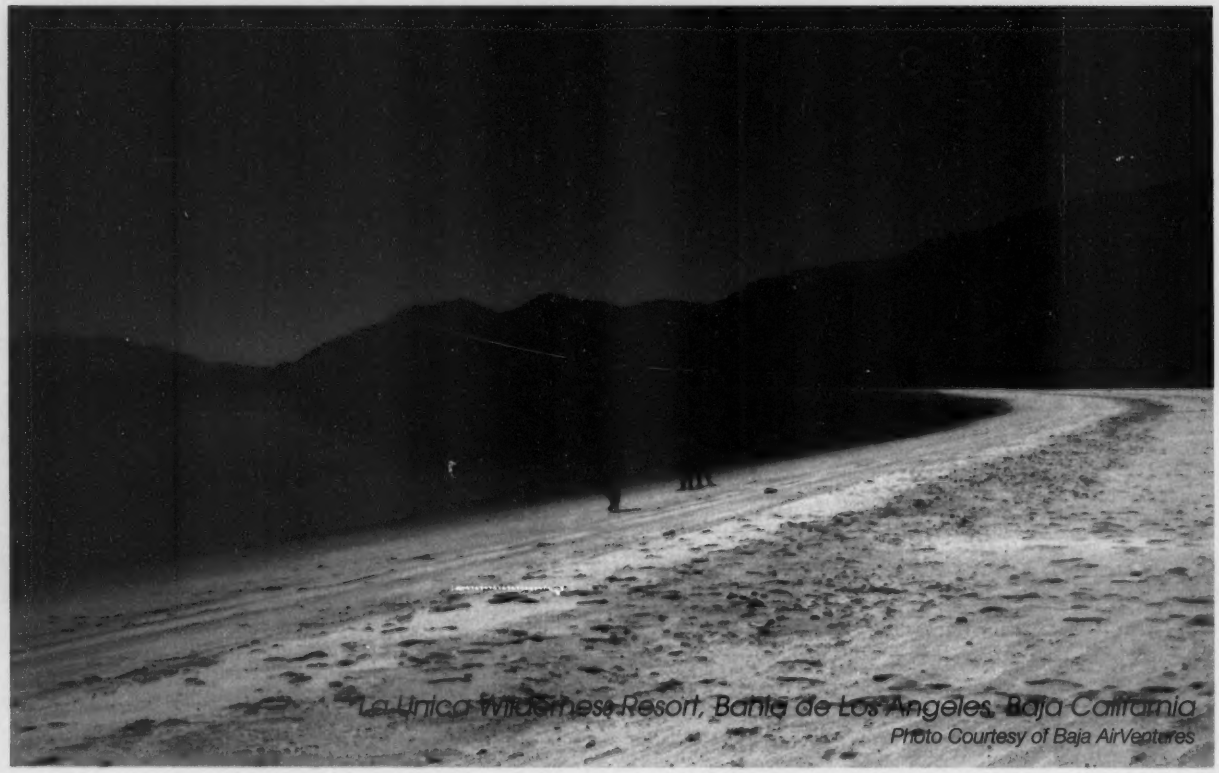
The weather in Baja California is predominantly VFR, although the Pacific Ocean coastal areas are prone to morning and evening stratus and fog. There are always exceptions to the rule. Even though Baja receives less than 10 inches of rain per year, seasonal tropical storms and hurricanes are not uncommon in late summer months. While single engine IFR is legal in Mexico, it requires the specific permission of the tower controlled airport commandante, which is rarely given. Prudent pilots will have enough leeway

built into their travel plans to accommodate unexpected delays. Temperatures in excess of 100 degrees can give new meaning to density altitude performance calculations for short unimproved airstrips, even at sea level, and with weather reporting stations few and far between, Mexican aviation authorities caution pilots to exercise good judgement and always leave yourself an alternative. Even in this pilot's paradise, "continued VFR flight into instrument meteorological conditions" is still a leading causal factor in accidents.

Planning and Preparation

For flight planning purposes, the CH-22 World Aeronautical Chart covers the entire Baja peninsula, except for the area directly adjacent to the United States border. The Los Angeles Sectional completes the picture with airspace for both the cities of Tijuana and Mexicali. Flights down the Sea of Cortez or Pacific coasts can be made at relatively low altitudes, but flights across the interior may encounter substantial terrain. The Sierra de La Giganta and the Sierra San Pedro Martir mountain ranges run the length of the peninsula, with the highest point on Picacho del Diablo (Devil's Peak) at 10,126 feet MSL. Baja California is extremely rugged and with 80% of the 2.5 million people living in the border area cities of Mexicali, Tijuana, and Ensenada, most flights will be flown in sparsely populated or uninhabited areas. Plans should be made for all contingencies. Basic emergency provisions should include water, survival gear, and appropriate clothing for mountain and desert conditions. Even though Mexican regulations require that a flight plan be filed for all flights, including VFR, failure to close a flight plan will not initiate search and rescue procedures. In fact, flight plans can only be closed at airports with air traffic control. You can legally fly to a remote resort for days or weeks without closing the flight plan you opened when departing one of Baja's seven tower-controlled airports. Your best insurance is to leave an itinerary filed with someone who will act on your behalf if you are overdue.

For piston powered general aviation aircraft, your initial landing in Mexico will be at a "first landing airport" of entry. This is most easily accomplished in Tijuana or Mexicali, though some pilots may continue to San Felipe, Ensenada, or further south. To leave the United States and enter Mexico, you must file a DVFR or IFR flight plan, and Mexican customs officials require a minimum of 15 minutes notification before entry. Both requirements are easily accomplished by including "ADCUS" (advise customs) in your flight plan remarks. After you activate your flight plan, Flight Service personnel will notify the appropriate Mexican facility of your intended arrival. If you choose to enter Mexico in Tijuana, the friendly ATC controllers at General Rodriguez International (MMTJ) ask that you make your entry directly from Brown Field (SDM) and overfly the airport mid-field. Avoiding the coastline eliminates conflicts with

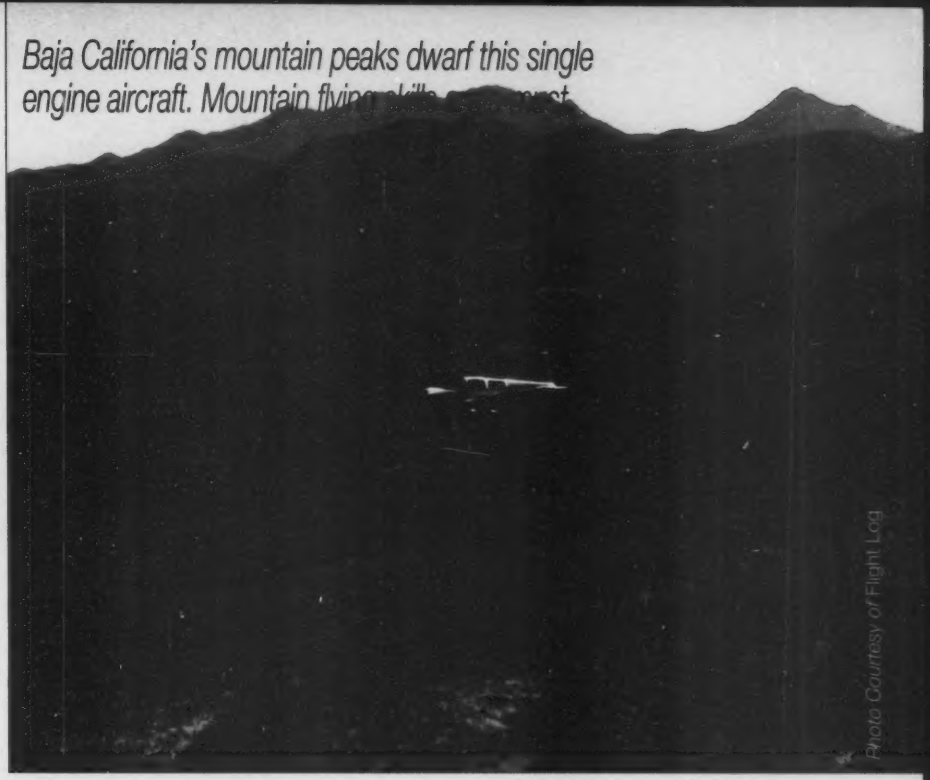


La Unica Wilderness Resort, Bahia de Los Angeles, Baja California
Photo Courtesy of Baja AirVentures

departing commercial traffic.

Upon landing at the airport of entry, your first task will be to obtain a general declaration, essentially a tourist permit for your airplane. Next, you will file a Mexican flight plan for the continuation of your trip. Your general declaration will be shown every time you open or close a flight plan in Mexico.

Unlike flying in the United States, user based fees are a basis for maintaining Mexico's airspace system, and expect to pay modest arrival and departure charges. You will also clear Mexican customs and obtain tourist permits for yourself and your passengers. This may involve several different persons and offices, but all is easily and quickly accomplished if you have your documents in order.



Baja California's mountain peaks dwarf this single engine aircraft. Mountain flying skills are a must.

Photo Courtesy of Flight Log

Fuel

All fuel is refined, distributed, and sold by the Mexican government-controlled petroleum industry PEMEX. Credit cards are not accepted for fuel in Mexico, cash only! The aviation grade 100 octane is readily available, and occasionally 80 octane can still be found, but outside of the major destination airports fuel availability can be intermittent or non-existent.

In addition to the tower controlled airports, fuel may be available at Punta Chivato, Mulege, and Guerrero Negro, but be sure to verify that your next planned fuel stop has an adequate supply before you leave. There are only 10 places to obtain fuel on the peninsula, and most are situated on the Sea of Cortez. This makes fuel exhaustion another prime cause of accidents.

Finally, aircraft multi-viscosity grade or engine break-in mineral oil is extremely difficult to find and you will want to bring your own supply.

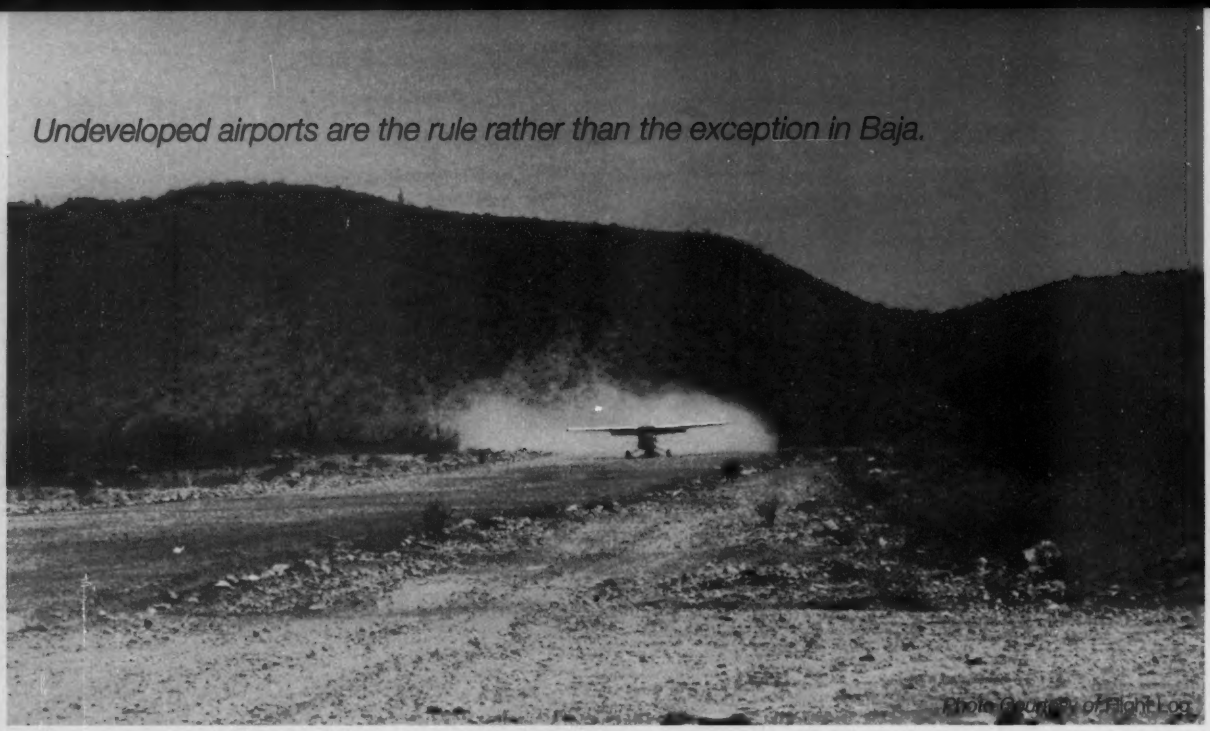
FAA San Diego FSDO Photo

General Rodriguez International ATCT, Tijuana, Baja California, Mexico.

Enroute

Airborne once more, it's finally time to enjoy the spectacular beauty of "Lower" California, but refrain from abandoning your airmanship at the border. While the air route traffic control center in Mazatlan is the primary radar facility for the Baja peninsula, aircraft altitudes must generally be in excess of 10,000 feet MSL before contact can be made. Therefore, the majority of flights in Baja are conducted outside of radar coverage, and position reporting is used for both IFR and VFR traffic.

Be prepared to copy reporting point clearances and respond to air traffic control requests for DME, or "distance from the appropriate ATC facility". Mexican authorities are continually frustrated by gringo pilots who fail to report as requested and delay the clearance of other aircraft over the same routing. This is especially true in the area of the Tijuana TCA (not Class "B" airspace), where there is a larger volume of traffic. Once in the interior of Baja, there is effectively no enroute air traffic control service, and it can be literally hundreds of miles between tower controlled airports, with no



Undeveloped airports are the rule rather than the exception in Baja.

Photo Courtesy of Flight Log

communications or services possible.

Navigation is not difficult on the Baja's narrow peninsula, although without global positioning system (GPS) capability you will be quickly reduced to the bare essentials. There are just seven VOR facilities on the peninsula, so a significant portion of your navigation will be accomplished using pilotage, with an occasional NDB or commercial broadcast station. Before beginning your trip a few hours of dual instruction in navigational basics, along with short and soft field takeoffs and landings, would be money well spent.

Destination

Numerous peninsula airstrips are little more than bulldozer tracks in the desert or dry lakebeds. In addition to their short length, many runways can have unusual slopes, little or no grading, dog legs, and one-way approaches or departures. Runway construction itself runs the full spectrum from conventional concrete/asphalt jetports to unimproved sand and gravel bush strips. What was a suitable strip the year before may now be closed for drug interdiction or eroded and washed out from the last tropical storm. Conditions of runway surfaces change rapidly because of both environmental and political factors.

After a bird's eye view of a remote landing site, seasoned pilots often make a low level overflight of their proposed landing strip to ensure that there are no hidden hazards, such as livestock, rocks, ravines, man-made ditches, or wire fencing. Your precautionary approach can also reveal surface wind conditions, as windsocks are not always present. If all this is not enough to contend with, you'll need to bring materials for securing the aircraft once you've successfully landed. Tiedowns are rare, and hangar facilities are virtually non-existent.

Becoming familiar with all available information before beginning a flight is critical in Baja, but if you have planned and prepared for your flight well, you will be rewarded with some of the most beautiful and memorable flying anywhere!

The Unexpected

Traveling in a foreign country is always an adventure, but occasionally the adventure can be a little more than you bargained for. One of the best ways to relieve your performance anxieties about traveling outside the United States for the first time is to fly with a group of aircraft. In addition to the camaraderie of your fellow aviators, you will be able to draw on the experience and knowledge of those who have "been there and done that!" The personal relationships these airmen have forged with their friends in Baja span decades, and if you encounter mechanical difficulty or illness their assistance can be invaluable. Both Los Angeles area based Flight Log and the legendary Baja Bush Pilots regularly travel south of the border and welcome first time adventurers.

If you prefer to strike out on your own, there are a few things you need to know:

- If you encounter mechanical difficulties, *you may not work on your own aircraft!* You will need to have your aircraft repairs accomplished by a licensed Mexican aviation mechanic. While a FAA mechanic certificate is not valid in Mexico, you will need to have a FAA certified mechanic oversee the repairs in order to make the appropriate maintenance record entry for return to service!
- If you have an aircraft accident or incident in Mexico, *report it immediately!* You must first notify the comandante of the closest tower controlled airport. Failure to do so could invalidate your insurance, and leave you

open to criminal charges. The accident must also be reported to:

National Transportation Safety Board
South Central Region
1200 Copeland Road, Suite 300
Arlington, TX 76011
(817) 885-6800

• Your Mexican general declaration will name the passengers your aircraft is allowed to carry while in Mexico. Do not change passengers or carry Mexican citizens, as this invalidates your general declaration!

• Keep your paperwork with you at all times. Your first contact at many uncontrolled fields may be Mexican military personnel, and your documentation will be scrutinized carefully to ensure you have entered the country, and are operating, legally!

• If you accidentally lose your pilot or medical certificates in Mexico, you will not be able to re-enter the United States without violating federal aviation and customs regulations. If you call FAA airman records during normal working hours, they can issue a fax that will function as a valid certificate until you receive your permanent replacement.

FAA
Airman Certification Information
AFS-760
Oklahoma City, OK 73125
(405) 954-3261

• And remember, *Relax!* The pace is slow in Baja, and that is its allure!

Return

Unfortunately, the long warm days relaxing in the tropical sun will come to an end far too soon, and while preparing for departure you will already be anticipating your next return. But, remember, the laws of physics and common sense still apply outside of the U.S. -- especially the minimum eight-hour requirement "from margarita to mags!"

Luckily, the trip back to the United States is simply a return to your original Mexican airport of entry where you will relinquish your tourist permits and general declaration, and file your final Mexican flight plan (plan de vuelo). The most demanding part of returning home will be entering the U.S.

Upon return from Mexico, U.S. Customs regulations require that *notice must be furnished at least 1 hour before crossing the U.S. coastline or border.* Concurrently, FAA regulations require that a flight plan be filed for all flights between Mexico and the United States. The difficulty lies in that while you have filed your final plan de vuelo, Mexican authorities frequently are not equipped to notify United States officials in sufficient time for your border crossing! Both FAA and U.S. Customs regulations clearly place the final responsibility for arrival notification solely with the pilot-in-command. Customs inspectors may be sympathetic to the difficulties of compliance but will enforce zero tolerance regulations which carry minimum $5,000 fines or aircraft seizure.

This airport is typical of what you will find in Baja -- isolated and primitive by North-American standards.

Photo Courtesy of Flight Log

The best way to accomplish this awkward task is to file a U.S. Customs notification of intent, before leaving on your trip to Mexico. This notice can be prefiled with an FAA Flight Service Station up to 30 days in advance of your return date and includes the same information required for compliance with FAR § 91.707. With your prefiled U.S. Customs notification, you will only need to update your estimated time of arrival with the FAA Flight Service Station no less than 30 minutes before crossing the border. Otherwise, you could wait over an hour at your Mexican departure airport before being able to enter the U.S.

The San Diego Automated Flight Service Station (AFSS) remote communications outlet in Yuma, Arizona has excellent range and is the recommended frequency for use in northeastern Baja, but communications on the northwest coast can be extremely difficult and may not be possible until just south of Tijuana. Many pilots who have not prefiled their return Customs notification of intent, attempt to do so while airborne approaching the border. This commonly results in serious frequency saturation. The San Diego AFSS specialists are extremely helpful and familiar with U.S. Customs notification requirements, but remember the responsibility is yours! If you have any doubt that your updated border crossing time was forwarded, call U.S. Customs or the AFSS from Mexico by telephone, before you arrive.

All the documentation you carefully verified and compiled before leaving for Mexico will be reviewed one last time. Make sure you, your passengers, and cargo remain in the Customs segregated aircraft arrival area until the inspecting officer has released you. Holiday weekends can be especially busy, and long waits for inspection are common, so planning for something as simple as physiological needs before arrival should be a high priority.

After the inspection officer completes a Private Aircraft Inspection Re-

MEXICAN REGULATIONS

- ✔ Aircraft which you do not own must have a notarized letter from the owner authorizing it to be operated in Mexico.
- ✔ You must have liability insurance issued by a Mexican company, before departure. U.S. aircraft liability insurance is not acceptable in Mexico.
- ✔ Private aircraft with a seating capacity of more than 16 must comply with commercial aviation requirements and obtain a permit 5 days before entry.
- ✔ You must be able to present your pilot and aircraft logbooks on demand.
- ✔ For international flights the aircraft must be equipped with two-way communications along with a valid FCC Radio Station License. The PIC must have a Restricted Radiotelephone Operator Permit, FCC Form 753.
- ✔ All occupants of your aircraft must have proof of citizenship. Passports or birth certificates are preferred.
- ✔ VFR is 1,500 feet and 5 miles.
- ✔ No night VFR flight is allowed.
- ✔ Firearms are strictly forbidden and a felony offense without a Mexican permit!
- ✔ Pets must be at least 3 months old, and you must show all pet immunization records.

U.S. CUSTOMS REGULATIONS

- ✔ The pilot-in-command must give notification of crossing the United States border, at least 1 hour in advance.
- ✔ The aircraft must land at the nearest designated airport to the border crossing point. In California, that would be Calexico (CXL) or Brown Field (SDM) in San Diego. Availability for customs services vary. Check with your proposed Customs airport of entry for their hours of operation.
- ✔ Aircraft may not cross the U.S. border before their declared ETA, or more than 15 minutes later than their declared ETA.
- ✔ The following items may be restricted from entry: Fruits, Vegetables, Plants, Plant products, Soil, Meats, Meat products, Birds, Snails and other live animals, or animal products. You should contact the US Department of Agriculture for further information.
- ✔ Importation of contraband, including agricultural materials, or undeclared merchandise can result in a minimum penalty action of $5,000 and seizure of the aircraft.

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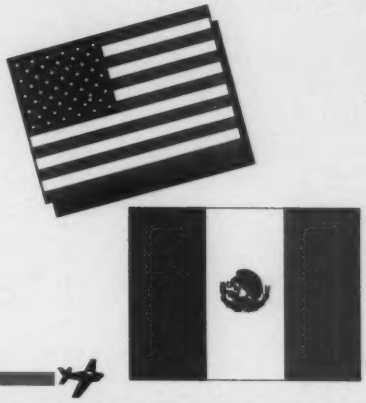
port (Customs Form 178) and releases you from the inspection area, you must pay an annual user fee. Personal checks are accepted. In exchange for payment, you will be issued a decal which must be displayed on your aircraft exterior "within 18 inches of the normal boarding area, and where it is visible when doors and hatches are open." The user fee decal is valid from January 1st through December 31st.

Amigos En Vuelos "Friends in Flight"

From the 17th century pirate lairs of Sir Francis Drake, to the prohibition-era grand casinos of Rosarito Beach and Ensenada, Baja California's rich, colorful heritage is both unique and fascinating. Blessed with the bounty of the sea and geographically secluded, the warm and gracious people of Mexico are proud to show you their frontier land. But don't wait too long, for change is inevitable! While Baja clings to its history and traditional values, her eye is on the future!

Mr. Ballenger is the Safety Program Manager at FAA's San Diego Flight Standards District Office. Ms. Price is one of Mr. Ballenger's Aviation Safety Counsellors.



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International Flight Information Manual
Federal Aviation Administration
Superintendent of Documents
U.S. Government Printing Office (202) 512-3054
Washington, DC 20402 FAX (202) 512-7703

U.S. Customs Guide For Private Flyers
Department of the Treasury, U.S. Customs Service
Superintendent of Documents
U.S. Government Printing Office (202) 512-3054
Washington, DC 20402 FAX (202) 512-7703

COMMERCIAL PUBLICATIONS
Senterfitt's Airports of Baja California and Mainland Mexico
Arnold Senterfitt
PO Box 34280 (619) 297-5587
San Diego, CA 92163 FAX (619) 688-9395

PILOT ORGANIZATIONS

Flight Log
PO Box 2465 (310) 391-4464
Fullerton, CA 92633 FAX (310) 390-9917

Baja Bush Pilots
1255 West Baseline, Suite 138 (602) 730-3250
Mesa, AZ 85202

FAA REGULATIONS

- FAR § 45.11 - Aircraft must have an exterior identification plate.
- FAR § 45.29 - Aircraft nationality and registration marks must be at least 12 inches high. (If your "N" numbers are smaller, you can legally place temporary 12-inch numbers on with adhesive tape, or other means if you wish.)
- FAR § 61.89 & § 61.101 - You must hold a Private certificate or higher to operate an aircraft outside the United States.
- FAR § 91.203 - Aircraft must have a permanent Certificate of Registration, FAA Form AC-8050-3. (No pink temporary "Aircraft Registration Application")
- FAR § 91.417 - If your aircraft has a fuel tank installed in a passenger or cargo area, you must keep the FAA form 337 (Major Alteration and Repair) on board the aircraft for inspection by law enforcement personnel.
- FAR § 91.703 - When in a foreign country, comply with that country's regulations relating to flight and maneuvering of aircraft. If the foreign country's regulations do not conflict, you must comply with the Federal Aviation Regulations and those of ICAO.
- FAR § 91.707 - When operating between Mexico and the United States, you must file a flight plan.

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IF YOU'VE DONE IT BEF

by Bill Belange

It's one of those moonlit nights. There's no moon and the stars are so bright you could reach out through the windscreen and put a few in your pocket. On the ground you can see the lights of cities and towns for 100 miles. The starlight is so bright you can see the horizon clearly. The alternating white and green flashes mark several airports, and you can easily identify the international airport and several regional relievers. Two uncontrolled fields are in sight, and you play your usual game of deciding which to head for in case of the trouble that never seems to come.

VFR night flight just doesn't get much better than this!

At first, it seems that the ground lights are getting brighter. Then, you realize the cockpit lights are getting dimmer. Suddenly the instrument lights get very bright then go dark altogether. You reach for the main breaker and turn it off then on again. It has no effect. You take inventory. No instrument lights. No panel lights. No radio lights. No blinks from the transponder light. Silence in the headphones. The bad news is it looks like an electrical failure. The good news is the engine seems fine, and you have two hours of fuel left.

There are two possible endings to this story.

Ending #1

Your first thought is to get some light in the cabin. You remember the flashlight in your flight bag. Does it have good batteries? But the flight bag is in the rear seat. You lean around to grope for it. Now, what does it feel like? There it is! Good, it's open. You can feel the maps and spare headphones. You root deeper and finally find a cylindrical object. Just about this time you hear the wind noise increasing. Look around front—the horizon is high and tilted. You recover from the spiral, but now you really want that flashlight. You can't see the instruments without it. If you had a working radio, you'd declare an emergency. Reach around again and dig some more. This time the stall warning horn sounds. Recover again. Nothing is more important than that flashlight. Reach around again....

Ending #2

This is not a problem. You're VFR with plenty of fuel, and you can see several airports. You can land easily without cockpit lights. There's a flashlight in the back, but it's hard to reach, so why bother? You really can't shine it on the instruments and land the airplane at the same time, anyway. You head for a lighted, uncontrolled field and land uneventfully.

What is the difference between these two endings? In the first case, the pilot became fixed on the problem of getting some light in the cockpit. This became the primary concern, and flying the airplane became secondary. While we don't know the eventual outcome of the flight, the pilot certainly experienced a crisis situation. In the pilot's mind, there was serious trouble. The pilot saw only the immediate goal, and this greatly impaired decisionmaking as well as piloting skills.

In the second case, the pilot had previously landed an airplane at night without cabin lights as a training exercise. When the real thing happened, the pilot did not feel in immediate danger. The pilot knew he or she could land the airplane without lights. The decisionmaking was smooth and clear, and the pilot turned attention where it belonged—to flying the airplane.

This only slightly fictional account illustrates a pcint about how people perceive and react to a crisis situation. If a person is faced with an unfamiliar situation, one that he or she thinks may threaten his or her well-being, he or she is likely to perceive this as a crisis. Mind and body will initiate a "fight or flight" response, and his or her mind will focus on the crisis to the exclusion of everything else. The important thing is the perception of danger, not necessarily the reality. When the safe outcome of a flight requires a pilot to do something he or she has never done before, this is likely to be perceived as a dangerous situation. It may or may not be dangerous in fact, but it is the perception to which a person reacts.

Conversely, in a familiar situation, the "crisis" is far less likely to exist, even though there may be real danger. A case in point might be the high steel workers who construct tall buildings. If there is no perception of immediate danger, decisions can be made with a clear head. Yes, there may be real danger, but it is a known danger. It is a situation the pilot has handled successfully before. He or she knows what to do and can concentrate on flying the airplane. This principle is not unique to flying. It is the whole reason behind the emergency simulations which are routinely practiced by emergency responders in many professions.

Student pilots are required to demonstrate certain skills as a part of their training. For example, most every student will do a "no flap" landing or two at some time during training, and he or she will learn to land without the landing light. Now, why would anybody turn off a perfectly good landing light during a night landing? Why would anyone want to learn to land without flaps when most airplanes have them? Why would anyone take a helicopter with a perfectly good engine and autorotate it to a landing?

While there is the obvious answer that these activities develop skill and judgement, there is also the less obvious answer. If you've already done it you're less likely to panic if you have to do it for real.

ORE, IT'S NOT A CRISIS

and Bill Miller

[Many years ago, during my third "supervised" solo, my instructor went over a few things he said I "might need to know." One of them was no-flaps landings. In fact we didn't do just one, we did several simulations with the flaps "stuck" at varying degrees. Within a week I was out solo in the practice area and returned to the airport, only to find that the flap motor had burned out. I had no flaps, but since I had just practiced no-flap landings and was confident of my ability to accomplish another, I could concentrate on flying the airplane and landing safely and not falling prey to student pilot panic.—Editor]

We, the authors, have explored this concept as it might apply to general aviation pilots. We examined procedures which have been practiced in both the military and in civilian instruction, and we have developed a short list of "unusual situations" which might be practiced at various stages of a pilot's progression through the ratings. These are not recommendations for any fundamental change in the teaching curriculum. Rather, they are optional maneuvers that might be used to make flying safer as well as more fun. While a few might be appropriate for student pilots, others might be accomplished at later stages, perhaps as a part of recurrent training. We have separated these activities into groups appropriate to various stages of flight training, from student through instructor. We have avoided anything that, in our judgement, might cause a greater danger than it prevents.

(Spin training is a good example of this philosophy. While spin training is not prohibited at any stage of civilian pilot training, it is only required for the instructor certificate. In the U.S. it is felt that civilian spin training would cause more accidents than it would prevent and is, therefore, not a part of the FAA endorsed standard curriculum until the flight instructor level. On the other hand U.S. Army students are required to demonstrate spin proficiency in spins and about 200 spins are normally practiced.)

The following are activities which might be suggested by an instructor or requested by a student in the pre-solo phase of training. The authors recognize that this would extend an already crowded program, but some students may relish the experience and be willing to spend the extra time before solo.

Landing at an Alternate Airport

When a student flies solo for the first time, he or she is carefully instructed to stay in the pattern. Not much thought is usually given to what would happen if the airport suddenly became unsuitable for landing—for example, if someone else were to land gear-up. The student would be stuck in the air until the runway was cleared, hopefully with adequate fuel for the duration. But what would such an experience do for the student's enthusiasm for flying? You can bet your attitude indicator that the student would have some second thoughts about the whole idea while droning around the field, and that emotional stress is not going to be all that helpful with the next landing. So why not teach the student how to get to an alternate airport at this stage? It certainly can't hurt. The student is going to have to do it later, anyway, and learning early will provide the student an "out." Pre-solo students have enjoyed this a great deal because they feel a real accomplishment in landing at a new airport.

Lost Procedures

These are also eventually going to have to be taught. While it is not a frequent occurrence, student occasionally fly away from the traffic pattern when they are not supposed to. This is seldom intentional (at least no one will admit it), but it happens anyway. With any luck they find the airport again, often with some friendly help from the ground. But what is the state of mind of a lost student pilot? Until that friendly, reassuring voice comes on the radio and saves the bacon, it's pretty close to panic. So why not teach the pre-solo student to fly to the VOR and then outbound to the airport? We don't suggest authorizing the student to intentionally leave the pattern at this stage of training, but if it happens and he or she has found the airport before, there will be a much less rattled student landing the airplane. (And there might have been one fewer student pilot flying around in the approach to a major international airport, as happened one day a couple of years ago. Very interesting talking him down.)

The following exercises are not part of the typical private pilot syllabus, but they might be done as part of a private pilot training program or could serve as part of a refresher flight, flight review, or the "Wings" program.

Airspeed Indicator Covered

This exercise proved very useful with a student pilot who couldn't seem to sense his airspeed. He was relying too heavily on the airspeed indicator, so the best solution was to take it away from him. When the airspeed indicator was briefly uncovered during this "lesson," the student was within a knot or two of the target airspeed during climb, glide, and final approach. This exercise worked for its intended purpose but had an unexpected side benefit. A few years later the pilot did not notice an inoperative airspeed indicator until after takeoff. He later thanked his instructor for the practice with the indicator covered. Circling around the pattern and landing was just a routine thing, not a crisis. There are two cautions to be observed in doing this exercise: Be sure the stall

warning is working, and, if possible, block the airspeed indicator so that the instructor can still see it. *[A round piece of poster board taped on the left side of the indicator and with a slight outward fold to the left of its center blocks the indicator for the student and allows the instructor (in the right seat) to peek. This works better than the suction cup covers which you have to take off to peek.—Editor]*

Landing with One Brake Only

This exercise demonstrates successful landing if one brake should fail. The pilot simply lands and taxis to the ramp using only one brake. (This might not work in tailwheel airplanes.) It served one of us well when there was a real need.

Power off Approach from Altitude to Landing

All students are taught power-off emergency landings at their home airport. And all students are given simulated emergencies where it is necessary to pick a field and line the airplane up for a landing. But how many students actually glide to a landing on a grass field from altitude? This exercise can be done as part of cross country practice. The instructor chooses a route that passes over a public-use grass strip, preferably one not in heavy use at the time. At an altitude above 3,000 feet AGL within glide distance of the strip, the power is cut. A student pilot is unlikely to recognize a grass strip as an airport, so the instructor will probably have to point it out. More might be expected of a private pilot—i.e., noting from the chart or from checkpoints that the grass strip is there and available for use. The landing should be a full stop. This does wonders for a pilot's confidence, and if a real engine failure should happen, the pilot is much less likely to panic and more likely to choose a well-reasoned course of action.

Real Dead Reckoning

This exercise allows the student to experience dead reckoning without the usual ground references. The instructor takes the pilot above a broken cloud layer (with reasonable confidence on being able to go through both ways without busting cloud clearance minimums). The pilot then navigates without radio aids to the destination airport. You'll find the pilot becomes surprisingly good at maintaining altitude and heading. A real nav radio failure then becomes a ho-hum event in VFR, even with restricted visibility. Again, the intent is not to teach VFR on top to a non-instrument rated pilot. It is to ease the stress if pure navigation by dead reckoning should ever become necessary.

Sloping/Very Narrow/Very Wide Runways

The object here is to challenge the pilot with a difficult or unusual landing situation. In all three cases, there are optical illusions which can cause a hard landing, a drop-in landing, or an excessively long landing. If the pilot has experienced these illusions and knows how to compensate, he or she is less likely to get into a situation where these illusions get the pilot in trouble. Again, self-confidence is enhanced, and there's one less worry during a critical phase of flight.

The following exercises might be appropriate for a pilot going for the commercial certificate or an advanced private pilot.

Real Short-Field/Soft-Field Operations

Many pilots today have never actually landed and taken off from a short and/or soft field. Many never will. In typical training, these techniques are taught on a moderate-to-large runway. When faced with genuine (rather than simulated) rapidly approaching trees, there is a tendency for the pilot to pull the nose up rather than to climb at Vx. Again, the tendency to panic overcomes good judgement and flying technique. On a real soft field, the takeoff run is a lot longer than in a simulated situation on six inches of solid concrete. If the pilot has experienced these situations, there is far less likely to be a panic reaction which could lead to an accident. In this case, take care not to exceed the limitations of the airplane and allow a reasonable safety margin.

Simulated Electrical Failure at Night

Sound familiar? This is the situation discussed in the introduction to this article. It can be legally and safely performed by simply turning out the landing light and all interior cabin and instrument lights. All legally required navigation lights are kept on, and the instructor uses the radio to communicate with other traffic or ATC. It helps if both the pilot and instructor have flown previously with the airspeed indicator covered. A working stall warning is essential.

The following exercises might be handy for an instrument rating candidate. These are in addition to the usual partial-panel work that is a normal part of the instrument curriculum.

Communications Failure Procedures

Most instrument training is done in VMC with some vision limiting device. The instructor often plays the role of ATC. While in this situation, why not simulate a communications failure? The instructor simply stops talking or perhaps informs the pilot there is a communications failure. This exercise can be done late in the instrument training or as a part of a refresher or instrument competency check. What better way to drive home the established lost communication procedures? And if it happens for real, what better way to prevent panic?

Practice Non-Gyro Approaches

This is certainly not restricted to non-gyro procedures. It might include an ASR approach, DF steer, or any of the others in the controller's bag of tricks. All that is needed is to contact ATC during a slack time and ask. It

might help to call ATC first by land-line so you can plan in advance for a time when the controllers aren't too busy.

Finally, there are a number of exercises that might be useful for flight instructors. In the case of instructors, they may be required to extricate themselves from situations they did not create. It's doubly important that the instructor not get upset or panic. Not only do you need a cool head to get out of a bad situation, but a demonstration of pure fright on the part of the instructor won't help the student very much either.

Aerobatics

There are any number of unusual attitudes yet to be discovered by enterprising students. A little aerobatic instruction makes a world of difference for the instructor. It doesn't have to be a full competitive aerobatics course, just a few hours of aileron rolls, snap rolls, loops, and precision spin recoveries. After such training, attitudes that used to seem extreme now feel tame. Even better, the instructor knows what the airplane is going to do when it suddenly goes inverted. Even better yet, the instructor knows how to put it right again. This confident attitude is readily apparent to the student. A visibly upset instructor cannot be an effective teacher.

Simulated Loss of Elevator

What would happen if an elevator cable broke in flight? Would you be able to land the airplane? It is possible to land an airplane using the elevator trim and throttle, but it's probably not something you'd want to do for the first time in a real situation. Instead, why not do it with an instructor carefully monitoring the process. That way if things get out of hand, the situation can be saved. Granted, this is not a likely failure. A runaway trim motor is far more likely and can also be simulated. Here again, a cool head is more likely to prevail if you've practiced it before it happens for real.

Full Power Uncoordinated Stall

Finally, there are a lot of common errors that students can devise to challenge an instructor. Uncoordinated stalls are only the tip of the iceberg but can produce some truly remarkable attitudes—both for the airplane and the instructor. An uncoordinated stall at full power is a good example. Of course, when you simulate this, the airplane should not be placarded against intentional spins, and the exercise must be done at sufficient altitude for spin recovery. The resulting half-a-snap-roll can be very instructive. Having recovered from this situation, the instructor's confidence gets a boost, and he or she will not panic if it happens inadvertently.

All of the above exercises are intended only as a menu of possibilities to add variety and challenge to flight training. All of them have been tried in practice and found to be legal, safe, and instructive. Instructors, pilots, and students can select from this list to add to a training program or simply as a way to make recurrent training more challenging and rewarding. But most of all, they give pilots experience with conditions they don't normally encounter. While they won't make an emergency go away, they can greatly reduce one of the biggest problems with emergencies—the panic they cause.

Take away the panic, and the pilot is far more likely to be able to handle the emergency successfully.

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CARB ICE VERSUS CARBURETOR HEAT

The REAL Cause of Many Unexplained Accidents?

by Pete Humphrey

No matter how many hours we have logged, that "carb ice" gremlin can sneak up and catch us by surprise. Engine runup on the ground is by far a better place to discover it than during flight. But many times it is during flight that carb ice rears its ugly head. And when it happens it may have progressed to the point where the only way is down; that is, an immediate landing with little or no available engine power.

But first, let's review this ever-present problem, look at means of detection, and share some timely methods for staying ahead of engine icing problems.

What Is Carb Ice and What Causes It?

There is always some degree of moisture (humidity) in the air that flows into and through an aircraft engine for every unit of fuel burned. A carburetor provides the explosive air/fuel mixture to each cylinder in the engine, where your power is generated.

As air is drawn into the small throat of a carburetor, the venturi effect accelerates the air and cools it. It cools even further when mixed with vaporized fuel. When this moist air reaches the freezing level of 32°F, the ice particles that begin to form deposit themselves on the throttle plate. The carburetor can then become choked up by this ice to the point that the engine receives less air than is required for full power. The once-explosive air/fuel mixture becomes so rich from excess fuel that the engine ceases to fire.

What Conditions are Conducive to Carb Icing?

Basically: Whenever the cooling effect of the air flowing through the carburetor is sufficient to bring the temperature of the carburetor throat down to 32°F or colder AND there is sufficient moisture in the air.

Specifically:

- If the outside air temperature (OAT) is between about 20°F and 30°F with visible moisture or high humidity
- If the relative humidity of the outside air is high, even in a cloudless sky, with an OAT as low at 15°F and as high as 100°F
- In the spring and fall, especially just after a rain

In other words, carbureted engines are susceptible to icing almost anytime.

Are All Internal Combustion Engines Prone to Carb Ice?

No. In pressure carburetors, fuel is admitted at a point past the throttle plate and downstream from the air inlet throat. It is well on its way to the hot engine before ice can form. In fuel-injected engines, the air/fuel mixture sprayed into the engine cylinders is metered into the hot cylinder at temperatures near that of a volcano. So, there is no potential for carb ice on either of these types.

Our concern is the mixture of evaporating fuel and moist air before it gets near the heat of the running engine, and this only occurs in the float-type carburetors found on most light aircraft.

Detecting Carb Ice

There are two opportunities to detect the subtle indication of developing carb ice. The subtlety is a gradual, small drop in RPM on a fixed-pitch prop aircraft, even though the pilot did not retard the throttle. On a constant-speed prop aircraft, carb ice is manifested by a gradual, small drop in manifold pressure (MP) while in flight.

If detected early and dealt with correctly you can easily prevent an untimely engine stoppage.

During Pre-flight Engine Run-up

On the ground during engine runup, ice is easy to identify positively and remove. On a Cessna, for example, at 1,700 rpm the carburetor heat control is pulled out fully to the hottest position. Because air entering the carburetor after application of carb heat is warm (from the engine compartment) and less dense, you will notice an rpm decrease of 100 to 300 rpm, and the rpm should remain low until the carburetor heat control is pushed all the way back in. However, if the 100 to 200 rpm decrease is noted but slowly begins to increase so that when the carb heat control is pushed back in the rpm reads more than the original 1,700 rpm, you had carb ice.

If it happened on the ground, it can happen again during takeoff. While lined up on the centerline, just before takeoff, I heartily recommend another carburetor heat check.

In Flight at Constant Cruise Throttle Setting

An often asked student question during their ground school training is, "If the engine fails in flight because of carb ice, why not just apply carburetor heat to melt the ice?" That is a reasonable question, but let's look at why that action is more than likely too late to help.

Carburetor heat is obtained essentially from within the engine compartment (rather than directly from the intake air filter on the front of the aircraft). If the engine has cooled sufficiently because of an excessively rich air/fuel mixture, there may not be sufficient hot air in the engine compartment to melt the accumulation of carb ice even with

the carb heat control to full "hot." That is the point when the engine will cease developing enough power to keep you airborne.

It is of the utmost importance to keep a sharp eye on engine performance at all times.

At the slightest hint of deteriorating power (from decreasing rpm or MP) use carburetor heat for at least eight to 10 seconds or for however long the aircraft's manual recommends.

The Explanation

Many accidents and off-airport landings may have occurred because unsuspecting pilots—having noted decreasing engine power during cruise—pulled on carburetor heat.

Their engine immediately began running very roughly and/or backfiring. In response to such noise, they removed carburetor heat and continued on their way. Continued, that is, until the engine continued to slow and eventually quit.

What happened? When the pilot applied carburetor heat at the first sign of decreasing power, the warm air from the engine compartment did just what it was supposed to do.

It melted the ice from the carburetor throat and throttle plate. Where did the melted ice (now water) go? Right into the engine that wants to burn gasoline, not water; hence, a momentarily rough and perhaps backfiring engine.

If carburetor heat had been kept on long, the hot engine and warm carburetor heat air would have kept the carburetor ice-free.

How to Fly Safely in Carb Ice Conditions

When icing conditions exist, apply carburetor heat often at your cruise throttle setting.

Never use partial carburetor heat unless the aircraft is equipped with a carburetor temperature gauge, ice light, or similar instrumentation. Partial heat can possibly make matters worse, unless you know exact carburetor temperatures.

Remember, full heat or nothing.

When below the green band on the rpm or MP gauge, apply carburetor heat. It is good practice to use it on any descent where you have reduced power.

If recommended by the manufacturer, use that carburetor heat control on aircraft at reduced power settings and especially for landing.

In conditions conducive to icing or if ice was noted during engine run-up, perform another carburetor heat check immediately before takeoff. DO NOT leave carburetor heat on for the actual takeoff.

Check your POH or aircraft manual for general guidance.

To be totally knowledgeable, I recommend that everyone read FAA Advisory Circular 20-113 concerning precautions and procedures for preventing induction and fuel system icing.

Final Reminder

Carburetor heat will keep carb ice from forming if applied early enough, often enough, and long enough.

AC 20-113, Pilot Precautions and Procedures to be taken in Preventing Aircraft Reciprocating Engine Induction System and Fuel System Icing Problems, *is free from U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.*

Mr. Humphrey is from Hagerstown, MD and is an Aviation Safety Counselor for the FAA's Baltimore Flight Standards District Office. This article appeared in the Baltimore FSDO's Aviation Safety Program newsletter, Mid-Atlantic Flight Safety Monitor.

Test Your Ability to Translate METAR/TAF

In the July/August issue of *FAA Aviation News,* an article explained how METAR/TAF works. Let's see how much you remember. Grab a piece of paper and try writing out the translation to the following METAR and TAF. Then, check how you did with the translations on the inside back cover.

METAR

SPECI KPWA 182020Z 25020G35KT 6SM VCFC +TSRAGR OVC025CB 32/24 A2998 RMK FUNNEL CLOUD B15 VC SW PK WND 26045/08 FRQ LTGICCCCG 5 SW TSB05 TS VC W MOV NE GR 3/4 CBMAM OVHD MOV NE

(Hint: KPWA is Wiley Post Airport.)

TAF

KOKC 051130Z 051212 14008KT 5SM BR BKN030 TEMPO 1316 11/2SM BR
FM 1600 16010KT P6SM SKC BECMG 2224 20013G20KT 4SM SHRA OVC020 PROB40 0006 2SM TSRA OVC008CB BECMG 0608 21015KT P6SM NSW SCT040 =

(Hint: KOKC is Will Rogers Airport.)

HUMAN FACTORS IN AVIATION OPERATIONS: THE "HEARBACK" PROBLEM

Prepared by the Seattle Air Route Traffic Control Center

On April 10, 1995, Seattle Center was controlling two southbound aircraft destined for Portland, Oregon. One aircraft was a *King Air* assigned 10,000 MSL and the second was a deHavilland *Dash-8* maintaining 11,000 MSL. The *King Air* was being radar vectored for sequencing behind the deHavilland and traffic information was provided to the aircraft. The controller then issued a descent clearance to 10,000 MSL to a military jet fighter being controlled on another frequency. The deHavilland pilot erroneously read back the clearance meant for the military jet and began descent to 10,000 MSL. The deHavilland passed within 3.4 nautical miles (NM) laterally and 700 feet vertically of the *King Air*.

On August 24, 1995, two separate flights of two military jet fighters departed Portland, Oregon, intending to conduct exercises off the coast of Oregon. The flights were requesting a block of altitudes from FL210 through FL230 but were cleared to FL190 due to a northbound passenger turboprop assigned FL200. The controller exchanged traffic information with all five aircraft. When the first military flight was clear of the traffic, a clearance was issued for them to climb to FL210. The second flight mistakenly acknowledged the clearance and began climbing, passing within 3.4 NM laterally and 300 feet vertically of the passenger aircraft at FL200.

Six weeks later, on October 14, 1995, two Cessna *Skyhawks* were conducting practice approaches to Paine Field near Everett, Washington. The first aircraft was maintaining 4,000 MSL and was assigned an alternate missed approach and told to expect an approach clearance shortly. The second aircraft was assigned 3,000 MSL and was then cleared for an approach. The first aircraft mistakenly acknowledged the approach clearance and changed to tower frequency. The controller, realizing the wrong aircraft was descending, attempted unsuccessfully to issue climb instructions. A second controller assisting with the position attempted to issue the same instructions to the tower controller, but was unsuccessful. The aircraft passed within 1.2 NM laterally and 400 feet vertically of each other.

In each of the examples, the pilot acted upon a clearance he was expecting to receive and the controller did not hear the erroneous read back. The situation is often thus:

Controller: "ABC, where are you going? Your assigned altitude was one one thousand!"

ABC Pilot: "XYZ Center, we understood our clearance was to one zero thousand; we read back one zero thousand!"

Controller: "Negative ABC! Turn right to zero nine zero degrees and descend immediately to niner thousand. You have traffic at 12 o'clock, one zero thousand, four miles!"

These situations are constantly occurring across the country. During one period, NASA's Aviation Safety Reporting System received 417 errant actions reports, consisting of deviations from assigned altitudes, nonadherence to DME crossing altitudes, turns to incorrect vector headings, and various flights over the wrong assigned routes. Of the 417 reports, 85 were submitted by ATC controllers and 332 by crewmembers. These erroneous actions precipitated hundreds of traffic conflicts, some narrowly missed midair collisions, go-arounds, aborted takeoffs and, as aftermaths to the incidents, the worrisome potential for administrative punitive action.

The crewmember narrative descriptions of the handling of ATC communications often reflected: "hearing one number and saying another...," "hearing what I expected to hear," "forgetting to change the altitude reminder to a new altitude," "mixing FL220 with FL200 or the one one thousand with the one zero thousand digits," "transposing DME miles into altitudes of crossing restrictions," "assumption the other pilot also heard the clearance," "habit conditioning," and scores of similar trip-ups between ear, voice, mind, and action.

The ATC controller reports described workload conditions in impersonal, formulated "system deviations/system error" terms, and, overall, tended to reflect objective rather than subjective viewpoints. Their verbal slips normally passed unnoticed in the continuing flow of messages to multiple aircraft. Only by reviewing the ATC voice tapes subsequent to an incident could participants hear what, in fact, had been said and to whom. Individual human-factor elements seldom were labeled as causal agents for the incidents; when mentioned, they were non-specific and general. "'Tis human to err," read such a controller's comment, and "I guess I proved I was human with this mistake."

One advantage of the incident-reporting system is the capability to reveal deep running, repetitive, causal patterns not discernible in individual reports. Perhaps the most import such pattern emerging from this study is a strong indication that an essential redundancy—the issuance of a clearance, followed by the pilot's response, and verified by the controller—frequently is missing from controller-pilot-controller exchanges of information. This "double-check" procedure element is termed "hearback" (the act of a controller's actively listening to a pilot's read back of an ATC clearance). The drop out of the hearback confirmation step reduces each communicator's role to the classic "one man

show" with its well-known consequences.

ATC controller reports clearly indicate acceptance of the double-check function as a procedural responsibility of the controllers. The controller's duty is dual: he/she must not only issue a correct clearance to the correct aircraft, but he/she must listen to the pilot's read back to ensure the airman has heard the message correctly. There is some irony in that a controller's "Operational Error" in communications frequently consists of not catching someone else's error.

Of the 417 occurrences studied, 328 featured airman listening/response deficiencies. Mishearing the numbers took place in 174 deviations, not hearing amended clearances were reported in 38, and inadequate "Roger," "Okay," and similar shortcuts in acknowledgment resulted in 46 nonadherences to ATC instructions. In 41 additional controller/pilot dialogues, airmen insisted they had read the numbers correctly: the controller had erred in the transmission. "I may have goofed" read a typical narrative "but I don't think so." Finally, 71 transmission errors were attributed to intracockpit mismanagement of the clearance. "It is easy for a flight crew to misunderstand an ATC clearance," explained one airman—an opinion supported by 173 other reports. "In my experience, flight crews are prone to interpret an advisory of traffic at some altitude as clearance to that altitude." "If flight crews plan or request a specific altitude, they tend to translate the next clearance into that altitude!"

The human factor inadequacies listed by the airmen were familiar and repetitive. Pilots heard what they expected to hear, heard what they wanted to hear and frequently did not hear what they did not anticipate hearing—amendments to just-issued clearances. There were consistent slips apparently caused by similar sounds of several number combinations—5 and 9, 7 and 17, 5 and 15, for example. The "one one zero" and the "one zero zero" thousand and the infamous Flight Level 200/220 mix-ups were reported in 40 incidents. One error pattern could be clearly identified: mishearing of the numbers occurred most frequently when single, one sentence clearance messages called for two or more separate pilot actions. Thus, "cross XYZ at one one thousand, descend and maintain one zero thousand, reduce speed to 250 knots..." or "Cleared to descend to Flight Level two two zero, cross the twenty DME of ABC at Flight Level two zero zero...." The overriding importance of controller hearbacks is obvious in these situations: virtually all the pilot reports manifested a trusting dependence upon the controller assurance function. Just as pilots always made read backs, controllers always listened to them. This is an unvarying, undoubting "leap of faith" by the pilot. Submissions to the study included "I read back, they didn't say anything so I descended...." "No challenge from controller, so we climbed...." This stamp of a controller's approval, albeit a silent one, clearly was accepted as the essential redundancy step during ATC dialogues. Pilot dependency upon a controller's listening role emerged a near naivete in accepting supposed clearances to below known terrain altitudes: "We took the clearance to 'descent to 7,000', made a read back and started down. However, we had to level off at 11,000 to clear the mountains. The captain then questioned the controller who said 12,000, not 7,000 had been assigned." The same dependence upon read back/hearback channels was exhibited in the scores of pilot reports: "Center called and asked if we had received an altitude restriction....We said 'No,' nor had we made an acknowledgment. This is an old problem with

What steps can each of us take to safeguard against read back errors?

1. Air traffic controllers must increase their awareness. An altitude mentioned for purposes other than a clearance, such as for traffic, may occasionally be interpreted by pilots as an instruction to go to that altitude.

2. Air traffic controllers must deliver cautionary messages such as similar call sign warnings. Pilots must listen to the radios closely when advised of these types of situations.

3. Air traffic controllers need to reduce the amount of numbers given in one transmission, i.e., don't issue an altitude, heading, altimeter, etc., all in the same transmission. This is frequently too many items to respond to when the pilots/co-pilots are busy with additional requirements.

4. Pilots and air traffic controllers must increase awareness of the read back when using the "magic" numbers that are frequently interpolated or misunderstood, i.e., One zero thousand and one one thousand, and Flight Level 200 and Flight Level 220.

5. Finally, pilots and air traffic controllers must commit themselves to improving the situation by listening carefully to the other! The solution to the problem is individual participation in the resolution.

A Suggestion from a Controller's Perspective

Flight crews often communicate with "the company" when approaching a destination terminal area. This is true of air carrier crews communicating on company frequencies as well as business and other general aviation aircraft calling FBO's on UNICOM. It is in the terminal area where the majority of transitioning occurs, i.e., altitude changes, radar vectors, speed control, traffic advisories, wake turbulence advisories, etc. In the terminal area, while speeds are reduced, so are separations, and spacing is critical. In this environment it is critical that pilots and flight crews maintain a close listening watch on the air traffic control frequency. If the aircraft is being flown by a crew, one crew member needs to monitor the operational frequency while the other talks "to the company." If the aircraft is being flown by a single pilot, the pilot should advise the controller and receive concurrence that they will be off the frequency for a brief moment of time. The controller can then issue any necessary instructions and the controller will not use valuable time making multiple calls to an aircraft without response.

Pilots should renew the habit/procedure of copying critical parts of ATC clearances; particularly altitudes, crossing restrictions, and route changes. Personal observations while riding in air carrier "jump seats" indicates that in many cases, this is a lost art with crews preferring to "dial in the numbers" in their altitude alerters, FMS, etc. There is much to be said for hearing the clearance, repeating it, and writing it down.

ATC...." Many of the pilots ended their reports with a single, repetitive query: "So, I made an error. But I made a readback. Why didn't the controller catch the error in my readback?" Comments ranged from: "While it is possible that we misunderstood the controller, nevertheless we were relying upon the controller to correct any mistakes in the read back" to "It is my opinion that I could read back my social security number and most controllers would not question it! Centers are worse than terminal facilities in the matter."

Tabulation of the 85 controller responses confirmed the controllers' overriding concerns with collision avoidance. Seventy of the incidents involved traffic conflicts that had developed from the ATC/pilot communications breakdowns. In the eyes of many of the controllers, deviations due to miscommunications had negligible impact upon the system until they "rang the bell" in a traffic conflict occurrence. "I asked the F/O about our descent clearance. He said, 'Down to 2,000' and set the altitude alerter to 2,000. After we leveled off at 2,000, the controller called to confirm we were level at 5,000. We told him we were at 2,000. The controller then said, 'you are passed your traffic, maintain 2,000'." "The controller said, 'What are you doing at 8,000! Make an immediate right turn to zero eight zero ...'" "Then he said, 'Disregard. You are by the traffic!'." "We said 'Affirmative, we're level at FL270.' The controller then said that traffic had been at FL270 but now we were passed our traffic we could stay at Flight Level 270."

The conflict alert system, the flashing electronic backup for controller observations for traffic separation lost or about-to-be-lost, was frequently negated by human factors: "Conflict alert observed. Immediate turns given but no acknowledgments from either aircraft. Targets merged with no separation and Mode C showing same altitude." "Conflict alert activated...I was too stunned at seeing ABC's data block at Flight Level 230 to react..."

In response to this alarming trend, Seattle Center conducted a month long assessment of read back errors, starting November 1, 1995. Interviews with the controllers, together with monitoring of the control room indicated that controller workload, and attention to higher priority duties, often prevented the controllers from participating in the assessment. Still, 389 occurrences were documented within the time period.

The read back errors can be divided into the following categories:

ALTITUDE: 121 occurrences. The most frequent type of error was that the pilots read back altitudes different from those assigned.

FREQUENCY: 91 occurrences. Pilots read back frequencies different from those assigned.

WRONG AIRCRAFT: 40 occurrences. Pilots acknowledged clearances that were issued to other aircraft.

HEADING: 33 occurrences. The aircraft either turned the wrong direction or read back the incorrect heading.

CALL SIGN: 30 occurrences. Most often the pilot omitted his call sign on the read back; however, sometimes the pilot could not get his own call sign correct.

RESTRICTIONS: 32 occurrences. Usually, these involved crossing restrictions designed to comply with inter-facility requirements. Some of these errors occurred with restrictions needed to provide separation from other traffic.

ROUTE: 23 occurrences. The route read back differed from the clearance that was issued.

Continued on Page 19

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FAA BANS SOME CHILD

by Alison Duquette

On June 4, FAA issued a final rule banning the use of booster seats, as well as harness and vest-type child restraint systems (CRS), on board all U.S. air carriers.

Tests conducted by the FAA's Civil Aeromedical Institute (CAMI) in Oklahoma City, OK have shown that these types of restraints do not provide adequate protection for infants and toddlers during aircraft takeoff, landing, and taxiing.

The CAMI tests concluded that booster seats elevate children without providing a side or back protective shell and, in some cases, provide no integral belts to help restrain the child. Also the unique characteristics of aircraft seats (i.e., seat back breakover) pose a problem found only in aircraft seats. Therefore, children large enough to use a booster seat are already required to have their own seat and in an aircraft are better protected by the seatbelt only. Vest and harness restraints do not attach to any type of rigid shell or platform and leave the child free to come in contact with injurious objects.

FAA Deputy Administrator Linda Hall Daschle said, "Aviation is absolutely the safest way for families to travel. The FAA's goal is to enhance air safety for children by educating families and promoting the use of the most effective child restraint systems that are approved for aircraft."

The FAA strongly recommends that all children who fly, regardless of their age, be protected by an approved restraint system that is appropriate to the child's size and weight. The FAA has tested several types of child restraints at CAMI. Based on those tests, the FAA recommends that:

- children under 20 pounds be restrained in an approved rear-facing CRS
- children weighing between 20 and 40 pounds use an approved forward-facing CRS
- children weighing over 40 pounds use the standard lap belt attached to all airline seats

FAA Deputy Administrator Linda Hall Daschle demonstrates the approved Child Restraint Systems. (Michael Malden Photo)

Current airline policies do not require parents to purchase a separate seat for a child under two years old. The FAR require children who are two years old or older to sit in a separate passenger seat. As with all passengers, FAA recommends that the seat belt remain fastened about the child at all times.

The rule, proposed in June 1995, will take effect in September. A companion rule from the National Highway Traffic Safety Administration (NHTSA) complements the FAA rule by requiring manufacturers to label booster seats and harness and vest-type restraints as "not certified" for use in aircraft. An "approved" CRS will have a label that reads:

This restraint is certified for use in motor vehicles and aircraft

For information on CRS in general aviation aircraft, contact FAA Aviation News at (202) 267-7953 for a back issue containing an article on CRS.

For a complete list of FAA safety recommendations for air travel with children, please call the FAA Consumer Information Hotline at 1-800-FAA-SURE.

ANOTHER KIND OF CURRENCY

FAA's Pilot Examiner Standardization Section in Oklahoma City, OK has asked us to pass along the following information.—Editor

Of all the requirements for currency that are spelled out in the FAR, there is one that is common to all pilots and flight instructors and is probably forgotten or ignored more than any other requirement.

FAR § 61.60 states that the holder of a pilot or flight instructor certificate may not exercise the privilege of that certificate past 30 days unless he or she has notified, in writing, the Airmen Certification Branch of their new address.

Sounds pretty simple, and yet this regulation is vague enough that even your crystal ball might have some difficulty defining exactly what you must do to comply.

All we really want to do is report a new address and order a new certificate, right?

Yet, many of us just seem to have an inborn dread of simply sitting down for the few minutes it would take to write the letter or fill out the change-of-address card.

We just keep putting it off, and that's the first problem.

Change of Address

Those who do take the time, however, still find difficulty in completing the task with all requirements fulfilled. While the basic task of informing the FAA of an address change is relatively easy, there are several items to watch out for.

First, you must identify yourself with your full name, social security number (SSN), grade of certificate, certificate number, and date of birth. (With over 3,000,000 records on file, we need to take care that your information is not appended to someone else's record.)

Then, include the new address and indicate it as such.

Here's an example:

Jane Quincy Pilot
SSN: 123-45-6789
Commercial Certificate number
123-45-6789
04/27/52
New Address: 987 Aviation Way
Anytown, VA 22222

You may be surprised to know that many pieces of correspondence come in with as many as three addresses, and we are left to try and sort out which is which. Please be sure that there is no question as to which is the new address.

So far, that seems fairly straightforward. After all, what could be more simple than telling someone about your new address? Well, read on.

There are several major requirements that are not fully explained in the regulations. Leaving out even one of them can generate a letter back to you from the FAA for the correction of your original letter. Let's unravel the mystery by looking at the most common errors.

First, you must make sure your letter is signed in ink with your legal signature. Many beautifully typed letters come in with no signature, and they must go back.

Next, if you are ordering a duplicate certificate, you must ask specifically for a replacement certificate and include a check or money order, made out to the U.S. Treasury, for $2.00 per certificate. A duplicate medical also counts as a certificate, so if you want both replaced, the cost will be $4.00. The request for both may be made in one letter and paid for with one check, but they will be returned to you in different envelopes, at different times.

Remember that a change of address card will not generate a new certificate. That only changes your address and, in most cases, will not confirm for you that the notification actually went into your record. You may do that by telephone if you wish by calling (405) 954-3261. With approximately 300 address changes per day, we do not have the money or human resources to respond in writing to every address change.

Another fine point is that if you do move, you are NOT required to get a new certificate unless you want one. You need only to notify us in writing of the new address. As long as the computer knows your new address, your certificate will still be valid.

Now, the big problem—the infamous P.O. Box and rural route address. A P.O. Box number or rural route address may be shown on your certificate as a mailing address. You must, however, include a physical street address if available or specify written directions or draw a simple map showing the location of your house. Without these your notification will be returned for correction, and that causes inconvenience as well as additional postage for everyone. A physical address will go into your computer record and not on the certificate.

Remember when you received your last new certificate in the mail? There was a stub left over after you cut out the certificate portion. This stub contains information concerning the issuance of that certificate that is very important to us when it comes time to replace or make adjustments to your record. Always save this stub for future use.

'Til Death Do Us Part

One final point that is, well, unpleasant but which is necessary to discuss. In the event of a pilot's death, *the family must notify the FAA and provide a copy of the death certificate.* Otherwise, the pilot remains in the airmen registry.

This came to light recently when a letter from the Administrator was mailed to all CFI's. A distraught mother received her son's copy, but he had been killed six months ago in an aircraft accident. She was very upset to receive a letter from the Administrator addressed to her dead son, and she

was inconsolable because she had figured since the FAA investigated the accident we should have known her son was deceased. However, to protect the integrity of your record, we simply cannot take anyone's word on your demise. (We have had disgruntled spouses try to notify us of their ex-spouse's death as an annoyance rather than reality.)

As unpleasant a task as it is to notify insurance companies, banks, etc., that a loved one is deceased, the only way to stop mailings from the FAA is to send a copy of the airman's death certificate to the FAA Airmen Certification Branch, AFS-760, P.O. Box 25082, Oklahoma City, OK 73125.

At the Civil Aviation Registry, Airmen Certification Branch, we respond to thousands of pieces of correspondence every month. Our employees work hard to serve you, the airman, and to take care of the needs you may have. Maybe these few pointers will help your next letter to be processed with delay.

CALENDAR OF EVENTS

1996 MID-SOUTH AVIATION FORUM

The 1996 Annual Mid-South Aviation Forum will be held August 26-28 at the Sheraton Four Points Hotel in Memphis, TN. This fourth annual event is a gathering of persons from throughout the aviation community. Guests at this year's event will enjoy noted speakers, aviation safety presentations, technical and industry exhibits, and a static aircraft display. Participation will include the FAA, general aviation, industry, and the military. Attendance is expected to exceed 450.

This year's event is sponsored by the Memphis/Shelby County Airport Authority, Aircraft Service International, and Wilson Air Center. Southern Region FAA organizations will host the conference. Contact David Young of Memphis Air Route Traffic Control Center at (901) 368-8537 for information and registration.

THE "HEARBACK" PROBLEM

Continued From Page 16

ALTIMETER: 19 occurrences.

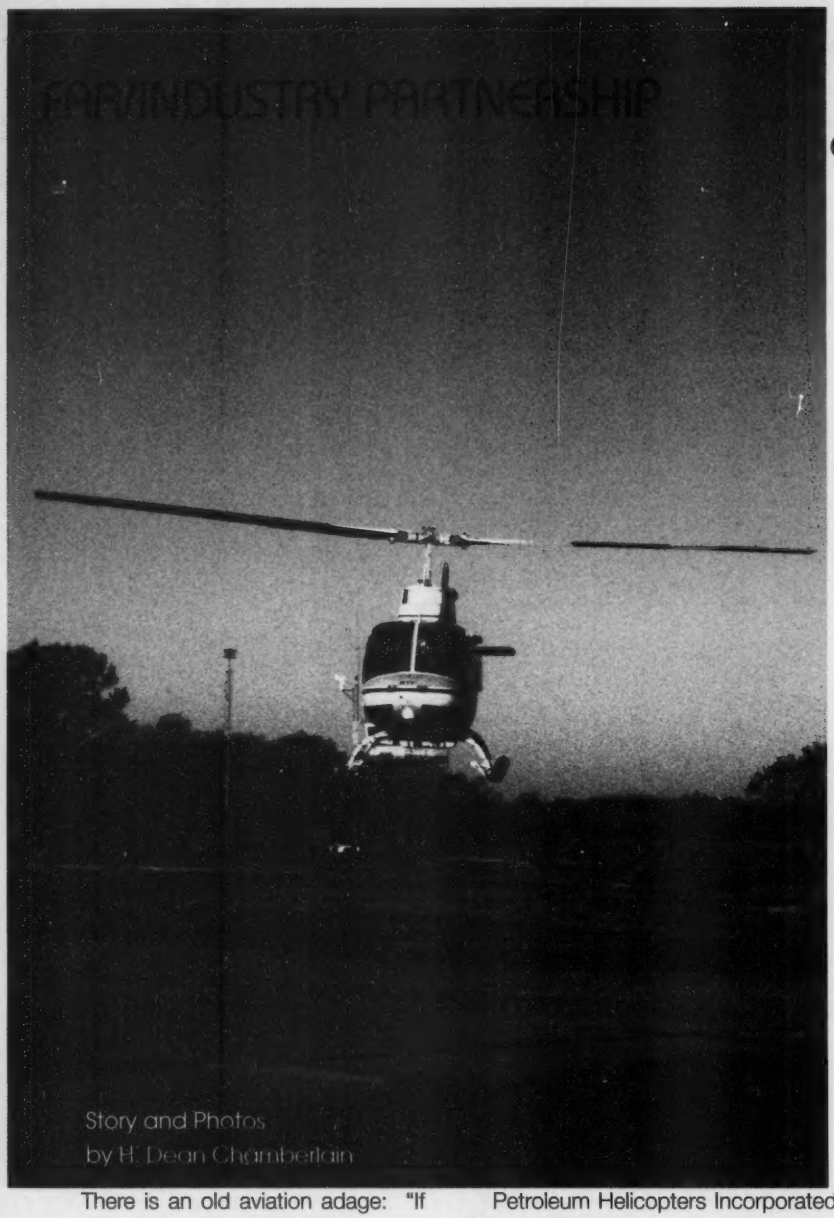
Seattle Center's study paralleled the information furnished by Battelle for NASA AMES Research: numbers sounded alike; clearance issued differed from the one the pilot was expecting; pilot hears what he/she is expecting to hear and reads back the published restriction; the pilot doesn't hear the call sign but does hear the clearance, he/she reads it back, expecting the controller to correct him/her if wrong; and, pilots/controllers often don't use call signs in read backs. The study revealed air carrier pilots committed 238 errors, air taxi operators 64, general aviation 61, military 21, and air ambulances had 5. Interestingly, the majority of the errors occurred on either Sunday or Monday.

Examination of the incident sets identifies several operational patterns, practices, and preconceptions in communications. The most consistent behavioral pattern was an overriding trustful dependence upon the controllers' listening function in the to/from exchanges. Half-heard, doubtful, sometimes guessed at numbers—if pilot readbacks passed unchallenged—were accepted as validated, double-checked instructions. Pilots subordinated commonsense judgement and operational practicality to an assumption from a controller's silence as "confirmation" of their read backs.

The principle conclusion of the study takes the form of a precaution to flight crews that a controller's not challenging a read back does not necessarily mean the readback is correct. The flight crews must explicitly question any doubtful or unusual aspects of clearances rather than depending upon the controllers to detect readback errors. Likewise, air traffic controllers must force themselves to actively listen to the acknowledgments and correct any incorrect clearances or call signs.

The errors cited and compiled in the Seattle study are relatively few when placed in context with the overall national airspace communications load. The occurrence of 389 reported incidents during a one month time frame represents but a ripple in the main stream of hundreds-of-thousands of to/from/to contacts being made daily. Even so, the existence of 389 notations is incontrovertible evidence that the hearback problem exists and is capable of producing operational anomalies with accident risks that are far from negligible.

The Air Traffic Control System is a cooperative one in which there are shared responsibilities between pilot and controller. Perhaps no area of shared responsiblity is more critical to the continued safety of the system than accurate, timely communications.



THINKING

One Company's Strategy

Story and Photos
by H. Dean Chamberlain

There is an old aviation adage: "If you think safety is expensive, try an accident." With headlines across the nation accusing the FAA of "cozying up" with airlines, it is refreshing to see a partnership with an operator that works, and the evidence is in the statistics—82,000 consecutive accident- and violation-free flight hours for an emergency medical services (EMS) helicopter operator. The company responsible for this opted for a cooperative relationship with the FAA and a commitment to safe operations, and they are willing to pay their employees to be safe.

Petroleum Helicopters Incorporated (PHI) decided early on to work with the FAA, and, to its credit, the FAA decided to work with PHI to achieve zero accidents. A Government oversight agency became the partner—not the adversary—of an entity it regulated, with positive results. Why it worked is partially because of the commitment to the promotion of safety by Flight Standards District Office inspectors in Baton Rouge, LA and partially because of the dedication to safety by PHI's CEO.

FAA's Dave Smith and Earl McCarthy are PHI's principal operations and maintenance inspectors, respectively, and they liken PHI's operation to that of a major air carrier. For example, PHI is developing a computerized data tracking system for its aircraft and maintenance operations, as well as a self-disclosure program to report problems to the FAA. Self-disclosure allows an operator to fix problems while they are minor in cooperation with the FAA and not in an adversarial enforcement action. McCarthy says, "The company has the responsibility to go out there and check that a cotter key is installed or that a nut is torqued properly or that the pilot is doing what he or she is supposed to do properly on a daily basis. They monitor that. That frees us up to do other things."

Smith notes that PHI brings FAA in on the planning stages of company aviation projects, so that "we have a chance to change things early, which also contributes to safety."

World's Largest Civil Helicopter Operator

PHI is the world's largest civil helicopter operator. Its corporate offices are located in a suburb of New Orleans, LA, and PHI operates and manages nearly 270 helicopters, a *Sabreliner*, a *Hawker,* and three *King Air* turboprop aircraft around the world. Nearly 1,700 employees provide the expertise to operate and maintain these aircraft. PHI Aeromedical Services operates helicopters in support of 14 emergency medical service programs nationwide.

Earlier we mentioned the commitment of PHI's CEO. Mrs. Carroll Suggs has established a unique relationship with the employees of PHI, which we'll see more of later in this article.

Mrs. Suggs is the widow of one of PHI's original founders, Robert L. Suggs, but rather than being the stereotypical "widow of the chairman of the board," Mrs. Suggs has left her mark on the company and has earned

SAFETY
for Zero Accidents

the respect of FAA inspectors in her dedication to safety.

PHI's Safety Record

Historically, PHI has had an accident rate one-fourth that of the overall helicopter industry. PHI's Director of Safety, Bruce Gillaspie, said, "PHI has always striven to give our clients the most efficient and safest transportation possible." In 1978 when the helicopter industry's accident rate was 20 per 100,000 hours, PHI's was 5.13. Gillaspie contributes this to several company actions—consolidation of training into one location, dedication of specific training aircraft to its flight training program, and standardized flight training for all pilots. Six years later, PHI's accident rate was below 3.0 per 100,000 hours, where it hovered, unchanged, for several years. Gillaspie used a home computer to do some analysis and discovered that 21% of their accidents involved new-hire pilots. Working with the Director of Training, Gillaspie changed the requirements for recurrent training of new hires—from one year after initial training to six months. "The result," Gillaspie said, "was zero accidents for pilots with less than one year with the company." PHI's accident rate fell to one to two accidents per 100,000 hours.

Well, you might say, with the U.S. having the best navigation and air traffic system in the world, not to mention the highest safety standards in the world, it is easy for an operator to reduce accidents. Did we mention exactly where most of PHI's operations occur? We didn't?

PHI's main business is servicing off-shore oil rig operations around the world in all kinds of weather.

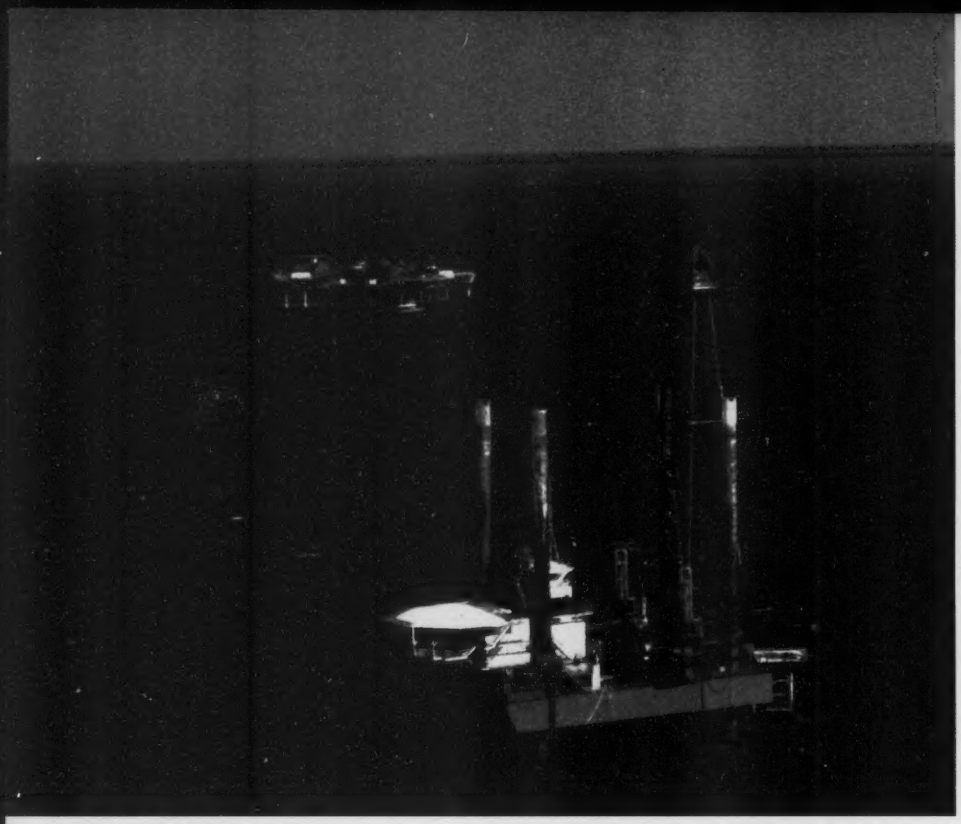
The Early Oil Business

In the early days of the off-shore industry, both the off-shore industry and the helicopter industry were growing and experiencing growing pains while proving the many capabilities of the helicopter. During the formative years, the helicopters were single-engine, piston aircraft with limited capabilities and reliability. There was a boom in the growth rate of the off-shore oil industry, but a corresponding "boom" in the accident rate involving helicopters. Competition among helicopter operators often came above safety, and both industries paid the price.

The off-shore oil business has matured as has the helicopter industry, and both have put safety back on top where it belongs. The way that off-shore drillers contract with helicopter operators is still competitive, but both have recognized that a "safety problem" can cost time and money in production.

Oil companies are some of the largest and wealthiest companies in the world, and, as a result, they can and do demand fast, reliable, and safe transportation for their employees and operations.

PHI came to realize that a goal of zero accidents would give them not only a safety edge in aviation but a competitive edge in the helicopter transportation business.



Zero Accidents Goal

It was Mrs. Suggs who, four years ago, decided PHI's goal would be zero accidents, exceeding its already enviable accident rate. This was not unprecedented. Between October 1993 and June 1996, PHI aircraft flew 520,000 accident-free flight hours with 2,000,000 takeoffs and landings while transporting 4,000,000 passengers.

The zero accident goal is the tip of a safety iceberg. The 82,000 accident-, incident-, and violation-free flight hours by PHI Aeromedical Services represent only the most visible part of PHI's safety program. The bulk or heart of that safety program and how it motivates employees to operate safely is hidden below the surface in the daily activities. Most of the day-to-day safety activities are not readily observant because the corporate philosophy is that safety is part of everyone's normal job.

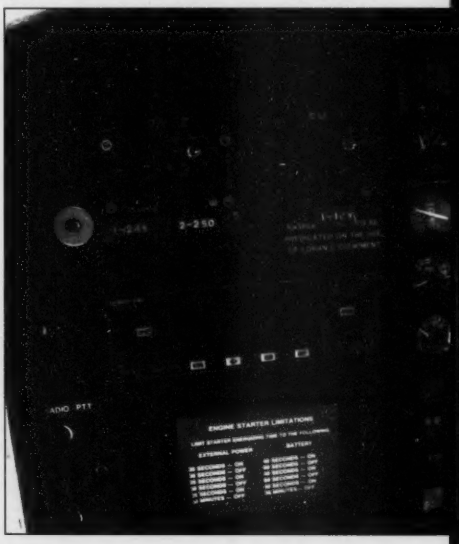
PHI's safety program also has another important factor—the safety standards it sets for its employees and operations. The safety standards established in the FAR, though the highest in the world, are, effectively, minimum standards. PHI establishes its own, more stringent operating procedures for minimum ceiling and visibility requirements, specific maintenance procedures, and other operating procedures. Their procedures provide a margin of safety above that required by regulation.

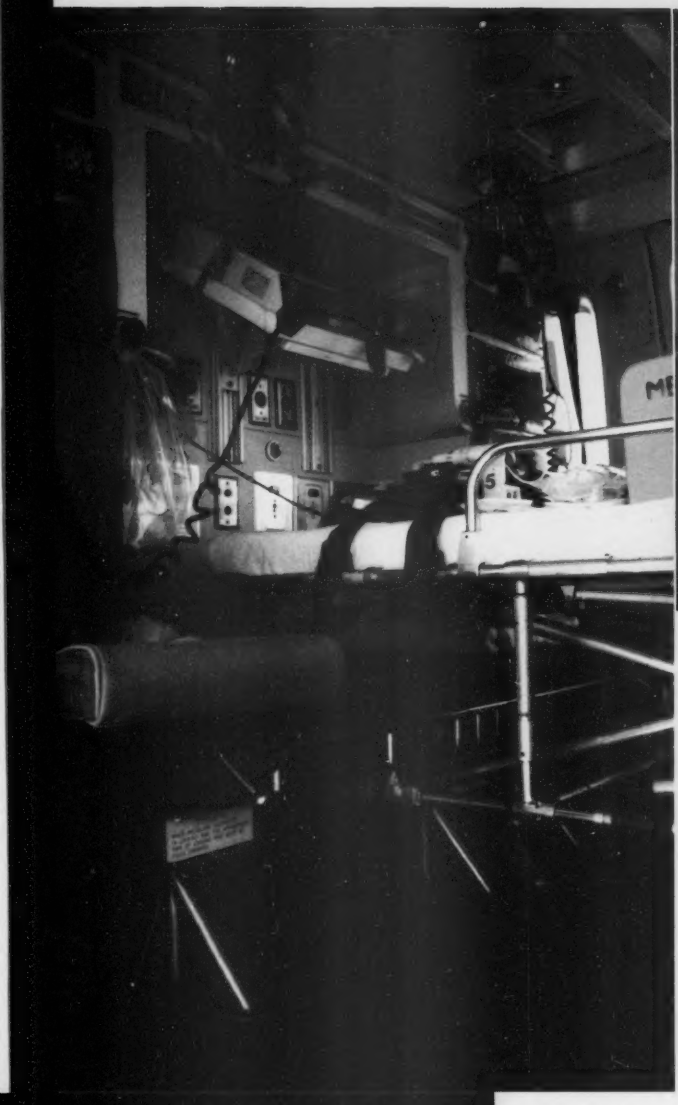
More importantly, employees are held accountable for compliance with PHI's self-imposed standards. Deliberate disregard of company procedures is grounds for an employee's termination. PHI's Chief Pilot, Michael Hurst, says, "There is no room for a pilot at PHI who does not accept PHI's way of doing things. You could be a four or five thousand-hour pilot interviewing for a job, but if you are not willing to operate by PHI's flight standards, you will not be hired."

Employees know that they will be held accountable for their compliance with safety standards, but they are also responsible for their fellow employees' compliance. There is a single safety program at PHI, applicable to all employees from the CEO on down, even though PHI is a diverse company with many different types of operations. PHI saw that the only way to make a single safety program work in a diverse company was to offer incentives to be safe. A four-person team was formed and tasked by Gillaspie to find a fair way to reward employees for being safe, taking into account that different employees in different aspects of the operation had vastly different risk exposure.

The team reviewed all internal and some other operators' safety programs for the common aspects and lifted those elements that lent themselves to PHI's needs. Then, PHI polled the employees to see what they wanted. The overwhelming response was money: "Give me money," said one practical employee. "I don't want pen and pencil sets or jackets or belt buckles or stuff that people can see. I want something that can benefit me."

Gillaspie's team developed a three-tier employee awards program based upon three levels of risk exposure. PHI employees were then assigned to one of the three "risk levels." The team then developed a cash safety reward program based on the three levels. Individual actions, team actions, and management actions would all be recognized and rewarded. All employees





in each level, then, were responsible for his or her own safety as well as the safety of his or her work group.

Each employee, then, has a financial interest in safety, and managers have a tool to ensure that safe practices are followed in his or her work area. Managers can also quickly identify and eliminate any unsafe practices or safety problems before an accident occurs. An added benefit would be a reduction of personal, on-the-job injuries that upset another oversight agency—the Occupational Safety and Health Administration (OSHA).

Mrs. Suggs accepted the plan with no changes, and she agreed to provide the start-up money for the incentive program—$1,000,000.

PHI maintains that "No one is owed an award. It must be earned by a conscious effort of the employee to work safely and to be safe." Awards are earned by consecutive periods of accident-free work. Low risk employees earn $100 each year they qualify. Those in the medium risk exposure group receive $150 for each safe year, with every fifth year's award based upon $75 for each consecutive qualifying year. High risk exposure employees earn $200 for each safe year, with their fifth year awards based on a $100 base amount. They also receive plaques for every fifth consecutive year they qualify.

Any employee is disqualified if he or she has an OSHA-recordable, lost-time injury or if he or she contributes to an OSHA lost-time injury for another employee. Also disqualifying is a deliberate disregard for safe working practices even if it didn't result in an accident or injury. Failure to report an on-the-job injury or property damage in a timely manner and any deliberate falsification or omission of reports are grounds for termination.

The FAA Connection

Like its safety program, PHI's relationship with the FAA is a good model for others to emulate. FAA has found that when an operator maintains open and consistent—sometimes daily—contact with its FAA principal inspectors, potential problems can be dealt with before they have an opportunity to become an accident, incident, or enforcement action. Both the FAA and PHI have come to work closely together to correct potential problems. Says a PHI official, "PHI is a compliant company. We want to do what is right."

Baton Rouge FSDO Manager Angela Elgee (left) and FAA Southwest Region Flight Standards Division Manager Thomas Stuckey (center) present the "High Flyer" award to PHI's CEO, Mrs. Carroll Suggs (right).

That sentiment is recognized and echoed at the FAA's Baton Rouge FSDO. Both PHI and FAA are quick to point out that their relationship did not develop overnight. PHI's safety record and FAA's relationship with the company are the result of a lot of hard work done one day at a time by both.

Although there have been many disagreements over interpretations of regulations and probably will continue to be, both PHI management and FAA inspectors agree that there has never been a disagreement over the important role safety plays in any aviation company. Part of the success, according to FAA Inspector Larry Barklage, helicopter unit supervisor at Baton Rouge, is that "PHI has a total commitment to safety that starts at the top management levels."

PHI has also incorporated FAA safety incentive programs into its safety program. Kay Fulkerson, Baton Rouge FSDO Safety Program Manager, indicates that a vast majority of PHI pilots earn phases of the Pilot Proficiency Award Program (WINGS) each year and most PHI mechanics also earn the various phases of the Aviation Maintenance Technician (AMT) Awards. PHI is also a company winner of the AMT award. Both award programs encourage pilots and mechanics to obtain recurrent training and continuing education and attend safety seminars throughout the year.

The Safety Award

This past spring, FAA's Southwest Region Flight Standards Division Manager Thomas Stuckey and Baton Rouge FSDO Manager Angela Elgee presented Mrs. Suggs and PHI Aeromedical Services with the Region's "High Flyer" award for its safety record. PHI deserved the award not only for its safety record, said Stuckey, but also for its commitment to safety and its willingness to operate in compliance with the FAR and to work with the FAA to ensure both safety and compliance.

Good pilots, good equipment, good training, and good management, not to mention good FAA oversight, all have contributed to the 82,000 safe operating hours flown by PHI Aeromedical Services. It was a team effort.

PHI's safety logo shows a helicopter in flight above the words, "Think Safety." Surrounding this are the words, "Because what goes around, comes around." FAA inspectors have "safety" in their job titles, and they know what they are responsible for every day. Not many corporations put "safety" out front so visibly. You have to think that any company that does is serious about safety.

So, the next time someone says, "Safety is too expensive," don't reply, "If you think safety is expensive, try an accident." Tell the imbecile, "Try zero accidents. It works."

PHI Mission Statement

"Our Mission is to provide worldwide helicopter services that are unsurpassed in safety and customer satisfaction.

"We are a team dedicated to continuous improvement in an environment that promotes trust, personal growth, and mutual respect."

FAA CHANGES FOR A "DYNAMIC INDUSTRY"

by Phyllis-Anne Duncan

On June 17 FAA asked ValuJet to cease passenger-carrying operations in light of preliminary results from an intensive 30-day inspection after the airline's fatal crash in the Florida Everglades May 11. At midnight on June 17, ValuJet complied with an FAA "consent order" to cease operations until corrective action, as outlined in the consent order, can be taken.

In-Depth Inspection

Some 60 FAA Aviation Safety Inspectors accomplished over 2,000 inspections on ValuJet from May 12 through June 10—the equivalent of four years' worth of inspections in a four-week period—and focused on ValuJet's overall operations. FAA was already in the midst of a 120-day special emphasis review of ValuJet as a result of several incidents and ValuJet's rapid growth. The post-accident 30-day inspection was an extension of this special emphasis review.

As a result of both the special emphasis review and the in-depth inspection after the accident, FAA found what Administrator David R. Hinson called "several serious deficiencies in ValuJet's operations." This included:

- failure to establish the airworthiness of some aircraft
- system-wide maintenance deficiencies in ValuJet's maintenance program
- multiple shortcomings in the quality assurance of contractors
- lack of engineering capability in ValuJet's maintenance department, which would impede ValuJet's ability to assign and direct repairs

The National Transportation Safety Board's (NTSB) investigation of the May 11 accident is on-going, and, as yet, no probable cause has been established or linked to the results of the FAA's in-depth inspection. There is some evidence that undepleted oxygen generating cannisters (indicated as "empty" on a shipping form) received from a repair station under contract to ValuJet and placed on-board ValuJet 592 as company material ignited a fire in the forward cargo hold.

Changes in FAA Inspection Policies

In light of the results of the ValuJet inspection and the unprecedented growth of airlines using contract maintenance and training, Administrator Hinson changed some of FAA's inspection policies.

1. FAA will require airlines to demonstrate compliance of each of their major contract maintenance and training programs.

2. Airlines must demonstrate compliance of each of their major contract maintenance programs at each facility doing substantial heavy maintenance or repairs. FAA will also review the repair station's procedures to ensure that they are part of the carrier's approved maintenance program, as well as review the carrier's quality assurance oversight of the work conducted by the contractor. (The contractor's work must conform with the carrier's approved maintenance program and must be carried out in accordance with the same regulatory requirements as the carrier.)

3. Airlines must also demonstrate compliance of their major contract training programs. FAA will review training conducted at each facility employed by the carrier to perform contract training and will also review each contract facility's curriculum to assure consistency with the carrier's approved training program. FAA will also review check airman involvement and the carrier's on-site oversight which is supposed to ensure that the contractor's services comply with the FAR.

4. FAA's principal inspectors will now require that all contractors performing substantial maintenance and training be included in the airline's operations specifications. Use of any new contractor will require approval by the principal inspector before it is added to the operations specifications.

5. Before new contractors are approved by the principal inspector and included in the operations specifications, the carrier must audit the contractor. This audit must demonstrate to the principal inspector that the contractor is capable of performing the contracted work in accordance with the carrier's approved programs.

6. FAA will also create new oversight requirements for inspectors who monitor repair stations and training centers. These new requirements will include special attention to airline maintenance activities being carried out at repair stations. For example, FAA inspectors now will be required not only to check the compliance of repair activities with the regulations governing the repair station but also to check that the carrier assures that the maintenance and repairs done by the station are in compliance with the airline's maintenance program.

Said Administrator Hinson, "It is important to note that the science of aviation is dynamic, and this agency is adapting its procedures to accommodate new trends in the industry....I will personally oversee additional efforts to make sure that we continue to adjust and adapt to the industry as it makes changes."

Changes in FAA Personnel

FAA also made some personnel changes as fall-out from the in-depth inspection. Long-time Associate Administrator for Regulation and Certification Anthony J. Broderick retired at the end of June, saying, "The events of the past weeks mandate that you

[the Administrator] make major, visible changes to improve the public confidence in the safety of our air transportation system and the quality of FAA oversight of the airlines. My leaving will provide you with the maximum amount of flexibility to make those changes and provide you the opportunity to select new leadership for a reinvigorated safety regulations program. The men and women of the FAA constitute the finest aviation safety organization in the world. There is never a good time to leave this wonderful agency, but for me that time is now."

The Associate Administrator for Regulation and Certification is the government official responsible for establishing the standards that airlines and airmen must comply with and for enforcing those standards within the aviation industry.

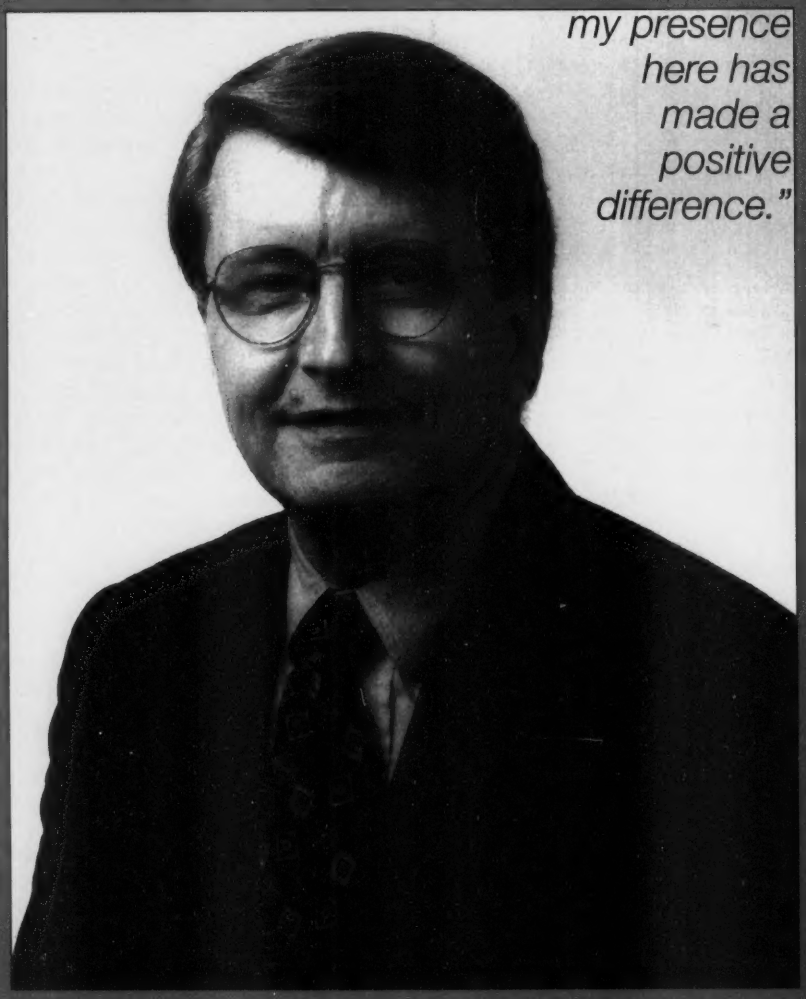
A certificated pilot, Mr. Broderick had been associate administrator since 1985. He joined the government in 1971 as a physicist at the Department of Transportation's Transportation Systems Center in Cambridge, MA, where he was an internationally recognized expert on the complex problems of upper atmospheric ozone reduction. He moved to the FAA in 1976 as Chief of the High Altitude Pollution Program Staff in the Office of Environment and Energy. While in private industry, he was a project manager for optical and electro-optical systems development. Mr. Broderick is a graduate of St. Bonaventure University.

He has received the Arthur S. Fleming Award as one of the 10 outstanding young men and women in Federal Service; has been awarded the Senior Executive Service ranks of both Meritorious Executive and Distinguished Executive; and has been awarded nine Senior Executive Service Performance Awards, the FAA Superior Achievement Award, and the Secretary's Award for Meritorious Achievement. In 1992 he was presented the *Aviation Week and Space Technology* Aerospace Laurel for Government leadership in assuring strong FAA safety oversight of foreign airlines operating into the U.S.

Mr. Broderick is respected among FAA employees, those in the aviation industry, and Congressional committees with FAA oversight.

As of July 1 Mr. Barry Valentine, formerly FAA Assistant Administrator for Policy, Planning, and International Aviation, was named acting Associate Administrator for Regulation and Certification until an agency personnel group, headed by Administrator Hinson, can select a permanent replacement. The committee will be considering candidates from inside the FAA and from industry.

From former Associate Administrator Anthony J. Broderick's message to his nearly 10,000 employees: "The work that each of you do is very important to the Nation. I ask that you continue those good efforts, and I hope that, in some small way, my presence here has made a positive difference."



HAZMAT TRAINING FOR GENERAL AVIATION PILOTS

by H. Dean Chamberlain

The headlines across the nation in May detailed the last few minutes of ValuJet Flight 592, which crashed in the Florida Everglades shortly after its takeoff from Miami International Airport. During the days following the accident, the carriage of hazardous materials on airlines became an important topic. Although the NTSB has the responsibility to determine the cause of the accident and although at the time this article was being prepared, NSTB had yet to make that determination, a prime suspect is the reported carriage of oxygen generating canisters as cargo on board the aircraft. Speculation is that this cargo may have either caused or accelerated a possible fire in the aircraft that might have contributed to the accident. (It is important to note that there may have been other causes of the reported fire on board the flight; one such cause being investigated is a possible electrical problem.)

When activated, the oxygen generating canisters can generate up to 500°F of heat. This heat can cause other combustible materials to catch fire, which, in the presence of the now oxygen-rich environment, can create a more intense fire. When used and activated as designed to provide emergency oxygen to passengers in case of a rapid cabin decompression, the generators are insulated and safe. But when not installed in their designated, insulated compartments in the passenger cabin (you know, where the flight attendant demonstrates how the masks will fall "in the event of a cabin emergency"), the canisters can pose a fire hazard if not properly stored and made safe.

The NTSB has reported that it suspects non-discharged canisters might have been carried as cargo on board Flight 592. If this is true, the transportation of the filled canisters as cargo may have been in non-compliance with ValuJet's operating authority. The airline had not requested nor was it authorized to carry hazardous materials. However, ValuJet maintains that the shipper designated the canisters on shipping documents as "empty."

Compressed gas oxygen cylinders used for medical purposes are still allowed to be carried on board by passengers because the cylinders do not pose a fire hazard while being used. Compressed gas cylinders do not use a chemical reaction, which creates heat, to produce oxygen.

HMR 175 list what HAZMAT items may be carried on board an airliner and the quantities allowed. The rules also list those items that are HAZMAT when shipped in larger quantities but which may be carried by passengers on their person in small quantities; e.g., perfume, after-shave, nail polish remover.

But this brings us to interesting questions: When is a hazardous material a hazard? As a general aviation pilot, do you know the rules?

Remember, the items that pose a hazard on an airliner also pose the same hazard on your general aviation aircraft. The key difference is you know about the potential hazard and have taken the appropriate safeguards. Right? Maybe?

But do you always know? Do your passengers know the HAZMAT rules? Have you ever asked your passengers what they are carrying on their person or in their luggage? If not, the following may save your life and the lives of those on board your aircraft.

Some of the common HAZMAT items prohibited in carry-on and checked baggage include materials we use around the home or in our recreation everyday with barely a thought as well as some uncommon items, such as infectious substances and medicinal radioactive material.

Some of the items may be carried in limited quantities on your person—toiletries, for example. The total can be no more than 75 oz., and the contents of each container may not exceed 16 fluid ounces. Matches and lighters can also be carried on your person, but lighters with flammable liquid reservoirs and lighter fluid are forbidden.

Dry ice used to pack perishable items cannot exceed four pounds, and the packing must permit the release of carbon dioxide. The potential buildup of carbon dioxide from dry ice in a closed, small cockpit or cabin can be a potential flight risk for general aviation crews and passengers.

Our final comment about HAZMAT is a safety one. The most important thing you can do as the pilot in command is to ensure that no HAZMAT items are carried on board, or, if they are, that the items are carried safely.

But, assuming you are carrying HAZMAT and it starts a fire on board, are you prepared to handle the situation? If you have passengers on board, are they prepared? Do you have adequate fire extinguishing devices on board or any other special materials that have to be used in case of an accident? Do you have an emergency plan? Have you practiced emergency procedures—included simulated on-board fire—with an instructor recently? Do you know and understand all the risks of the materials you are transporting?

Now may be the time to develop your own HAZMAT emergency plan.

FAA REVIEWS NTSB HAZMAT RECOMMENDATIONS

by Bob Hawk

The FAA has begun an immediate review of safety recommendations issued on May 31 by the National Transportation Safety Board as a result of preliminary findings from the investigation into the crash of ValuJet 592 in Florida on May 11.

FAA Administrator David Hinson said, "The FAA will thoroughly review the Board's recommendations as quickly as possible. We agree with the thrust of the recommendations, and we will now assess them in the context of the various actions the FAA instituted both before the accident and in the days immediately following it. Safety is the FAA's highest priority."

The NTSB's recommendations and FAA's preliminary responses are as follows:

• *Permanently prohibit the transport of oxygen generators on any passenger or cargo aircraft when the oxygen generators have passed their expiration dates and the chemical core has not been depleted.*

The FAA concurs with the intent of the recommendation, and effective May 24, DOT banned the transportation of all oxygen generators as cargo on passenger-carrying aircraft, irrespective of the generators' expiration dates or the state of the chemical core. The ban is an interim rule effective until January 1, 1997. FAA has been accepting public comments on the interim rule and will subsequently determine whether to modify, expand, terminate, or make the prohibition permanent. Within a week of FAA's ban, the United Kingdom and Canada followed suit.

• *Prohibit the transportation of oxidizers and oxidizing materials that pose fire hazards in cargo compartments that do not have smoke or fire detection systems.*

The FAA has already begun a review into the air transportation of oxidizers and has, with another DOT agency—the Research and Special Programs Administration (RSPA)—begun research into the categories of hazardous materials (HAZMAT) allowed to be transported on passenger aircraft. Appropriate restrictions on HAZMAT that pose fire hazards to cargo compartments will also be studied. FAA also began reviewing its regulations on fire detection and suppression in Class D cargo compartments.

• *Immediately evaluate the practices and training of all carriers for the acceptance of passenger baggage and freight, including company materials, and for the identification of undeclared hazardous materials. The evaluation should cover all personnel, including ramp personnel, who accept packages for shipment.*

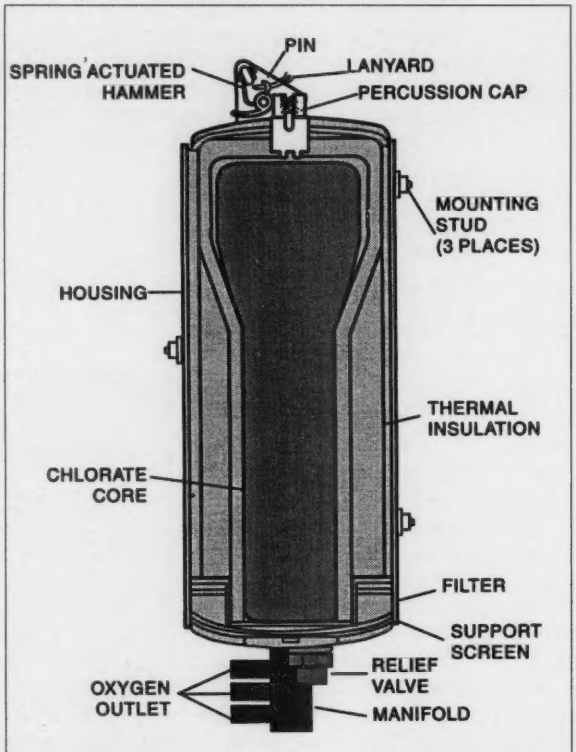
The FAA agrees with this recommendation. Shortly after the ValuJet accident, FAA initiated a comprehensive review of the regulations that allow shipping of hazardous material by air, including issues raised by the accident itself. Preliminary information from that review was swiftly provided to the NTSB to assist in its investigation.

FAA continues to review HAZMAT regulations (HMR 175), inspection and enforcement programs, and the training requirements for both shippers and carriers, regardless of whether the hazardous materials are being transported as baggage, cargo, or company materials. Among other things, this review will focus on training requirements for all personnel who offer and accept hazardous materials for transportation by air.

For example: Recently, two inspection efforts related to the February 22 special emphasis review of ValuJet were undertaken. Between May 16 and May 20, FAA initiated and completed focused inspections of all 31 ValuJet stations. On May 29, FAA inspected the major repair stations that service ValuJet to determine the level of their knowledge of and compliance with the HAZMAT regulations.

• *Require air carriers as necessary to revise their hazardous material training based on the evaluation required by the previous recommendation.*

The FAA agrees with this recommendation, and changes to training requirements and procedures for air carriers will be developed as appropriate, based on findings from the review underway and recommended by NTSB.



Cross-section of typical oxygen-generating canister

• Appropriate Checklist

I am hoping you can answer this question in your "Flight Forum" section of FAA Aviation News

Recently, I was part of a hangar flying session in which the subject of checklists came up. One of the pilots present was quite emphatic in his belief that a checklist is required for all flights, even those performed under FAR Part 91, and that further the checklist must be the checklist that was provided by the manufacturer of the aircraft being flown. However, my counter was that these assertions are both in error.

From what I can determine, no regulation appears in FAR Part 91 mandating the use of a checklist. Although a greater emphasis has been placed on the use of checklists in the private pilot practical test standards, and as a flight instructor, I certainly emphasize the regulations and proper use of a checklist for all phases of flight, from what I can find use of a checklist is not required by regulation until one examines FAR Part 135—specifically, § 135.83 which mandates both that a checklist must be provided and the pilot must use that checklist.

Further, I can find no mention of what constitutes a "current and appropriate" checklist as mandated by § 135.83. This regulation only states that the operator of the aircraft must provide a "current and appropriate" checklist, but fails to mention where that checklist comes from. It has thus been my contention that a checklist may take any form, as long as it possesses as a minimum those items given in the checklist which appears in the aircraft's operating manual. For example, if a checklist which was provided with the aircraft was poorly designed—an example might be an entry such as "Static ports - check" which is located in only one place in the checklist although static ports are present on both sides of the aircraft—I do not see that the regulations prohibit even an operator under Part 135 from rewriting the checklist to make it easier to use. For instance, in the above example, the item "Static port - check" might appear when the pilot would first encounter one of the static ports on one side of the aircraft, then again after the items listed for the empennage preflight checks for an aircraft with static ports located on the aft fuselage. This would allow the pilot to make a more efficient preflight check, without relying on pilot memory for such items.

It would seem that regulations would permit such a rewriting of the checklist, and even such additions/modifications as addition of items not appearing in the manufacturer-provided checklist but deemed important by the owner and/or operator (checking alternator belts on Cessna singles and clearing of pitot-static drains on Pipers come to mind; neither appears in the manufacturer-provided checklist), reprinting the checklist in larger type so as to be easier to read, or even color-coding of checklist pages to make location of the emergency checklists easier to identify. Provision of a "current and appropriate" checklist would seem to allow this, as long as care is taken to ensure that all of the items which appear in the manufacturer-provided checklist appear in the rewritten one. As a CFI, I would certainly be for any modification of checklists that would make them easier to use, as I feel that ease of use would make pilots more willing to use the checklist in the first place, as well as making for better retrieval of information from the checklist when it is consulted. Regular use of a checklist is very important, but difficult for those of us in the right seat to encourage when students encounter manufacturer-provided checklists that are poorly written, difficult to find things in, or printed in such microscopic type as to make them unreadable by all but the most eagle-eyed pilots. I would certainly love to, with a clear conscience, tell my students that they can rewrite the checklist to make it more "user friendly" as I would find use of such a "homemade" checklist preferable to inadvertently omitting items due to a poor checklist design. After this hangar flying session, however, I wonder if doing so is legal.

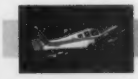
Given all of this, could you clarify what constitutes an acceptable checklist, when one must (by regulation) be used, and where those regulations can be found?

Sue A. Critz
El Paso, TX

First, as you said, FAR § 135.83 and then FAR § 121.315 discuss cockpit checklist requirements for FAR Part 135 and 121 operators. FAR Part 91 has no similar requirement. Checklists for FAR Part 91 operations are inferred rather than stated as a FAR Part 91 requirement. For example, FAR § 21.5, Airplane or Rotorcraft Flight Manual, discusses the requirement for flight manuals and their content. FAR § 23.1501, General, discusses the establishment of operating limitations for aircraft. Then FAR § 91.7, Civil aircraft airworthiness, and FAR § 91.9, Civil aircraft flight manual, marking, and placard requirements, plus FAR § 91.3, Responsibility and authority of the pilot in command, and FAR § 91.103, Preflight Action, all combine to make the pilot in command responsible for the airworthiness of the aircraft as well as its safe operation within its type certification authorization and limitations. The result is a derived checklist based upon an approved flight manual, pilot operating handbook, or in the case of older aircraft, an operating manual, to ensure the pilot's compliance with appropriate aircraft operating limitations, airworthiness requirements, and safe operating requirements of the FAR.

Based upon the above, you can make your own checklists for FAR Part 91 operations as long as they comply with the appropriate FAA-approved manufacturer's operating procedures and limitations and do not contradict good safe operating procedures.

The bottom line is the pilot in com-



mand is responsible for the safe operation of his or her flight. Checklists are one means to help the PIC comply with his or her FAR responsibilities and obligations.

• Using PIREP's

Just the other day, a pilot who flies for a commuter airline stopped by our facility and asked us a question about pilot weather reports. His question was simple. "How long are pilot reports valid."

He used the following scenario to illustrate his point.

"I am inbound or outbound to an airport, and a report of severe icing is provided by another pilot. The Federal Aviation Regulations (FAR) prohibit flight into known icing conditions. The FAR coupled with the report of severe icing has now virtually shutdown operations into or out of this particular airport." The main question here is "for how long?"

A part-time ATC tower is closing for the night and the runway visual range (RVR) is last reported as 1400 feet. Being that the RVR is below minimums for FAR Part 135 operations and direct RVR readings are no longer available, "How long are approaches shutdown into this airfield?" Do they have to wait for the next aviation weather report?

Don Collins
Huron, SD

Let's answer the easiest question first. FAR Part 135 operations require a current weather report as outlined in FAR § 135.225. The airport is shut down for FAR Part 135 operations until the latest FAA approved weather report is available and the airport weather is reported at or above required FAR Part 135 minimums.

Regarding pilot reports (PIREP's), they are unofficial pilot reported weather phenomena at a particular location and moment in time. As outlined in the Aeronautical Information Manual (AIM), para. 7-1-19, PIREP's are used by ATC and the National Weather Service in preparing weather reports and in air traffic control. Regular PIREP's are valid for one hour and retained in the weather reporting system for about two hours. Urgent PIREP's are retained for one hour. Because of the unofficial nature of PIREP's (non-approved weather reporting source), they cannot be used to comply with the requirements of FAR § 135.225. Therefore, the airport is not shutdown by a pilot report.

FAR § 135.225(a)(1) specifies that for FAR Part 135 instrument landing operations, the required weather reporting facility must be one operated by the U.S. National Weather Service, a source approved by the U.S. National Weather Service, or a source approved by the (FAA) Administrator.

FAR § 135.227, Icing conditions: Operating limitations, discusses flight into known or forecasted icing conditions. Subparagraphs (c), (d), (e), and (f) of FAR § 135.227 apply.

Pilots operating under FAR Part 135 must comply with this and other appropriate regulations and their operations specifications when icing is forecasted or known. Because of the many different types of aircraft used in FAR Part 135 operations and the fact that many aircraft have FAA approved anti or deicing equipment onboard that permits flight into certain icing conditions, it is hard to generalize an answer that applies to every operator. Each FAR Part 135 operator must operate within the operational and equipment limitations that apply to a given flight in a specific aircraft to a given airport.

To ensure that PIREP's are accurate when reported, pilots should periodically review the AIM to ensure they use the recognized criteria when reporting PIREP information because what may be severe conditions for a small, single-engine aircraft may not be severe conditions for a large, fully equipped turboprop aircraft. This is why it is important to consider the type of aircraft that reported a PIREP, when evaluating a PIREP.

But, regardless of format used, all pilots should report significant or potentially hazardous weather to Flight Watch, Flight Service Stations, or ATC. FAR Part 135 pilots have an obligation to report potentially hazardous weather under FAR § 135.67. In many cases, a PIREP may be the most recent weather data a flight service station may have. When dealing with PIREP's, it is important that pilots check the time the PIREP was made.

• Passing Judgement—or Is It Judgment?

What's with you people? Don't you know how to spell a simple word like "judgment?" Everywhere in FAA Aviation News *I see it spelled "judgement." Is this the dumbing down of America?*

Name Withheld

Actually, the British would say spelling it with one "e" would be the dumbing down of America. "Judgement" is the British spelling, and since the Editor is from good Scots and Irish stock, "judgement" it is. Also, in the days when printing type was hand set one letter at a time, typesetters often omitted the first "e" so they wouldn't have to divide "judgement" awkwardly at the end of a line. Most dictionaries will accept either spelling.

FAA AVIATION NEWS welcomes comments. We may edit letters for style and/or length. If we have more than one letter on the same topic, we will select one representative letter to publish. Because of our publishing schedules, responses may not appear for several issues. We do not print anonymous letters, but we do withhold names or send personal replies upon request. Send letters to Editor, FAA AVIATION NEWS, AFS-810, 800 Independence Ave., SW, Washington, DC 20591, or FAX them to (202) 267-9463. INTERNET address:

Phyllis_Duncan@mail.hq.faa.gov.

AEROBATIC COMPETENCY EVALUATIONS STANDARDIZED IN U.S. AND CANADA

The International Council of Air Shows (ICAS) has completed an initiative to implement the Aerobatic Competency Evaluator (ACE) program in Canada in an effort to harmonize the North American air show industry.

Effective in June, ICAS will make the peer review program available to evaluate and certify air show pilots in Canada. Currently, ICAS and EAA Warbirds evaluate more than 500 pilots annually for the FAA through the ACE program.

In use in the U.S. since 1991, the ACE program arose from the need to have evaluators with expertise in the complexities of performing low-level aerobatics at public aviation events. "The environment is quite different from any other form of aviation activity, including amateur competition," said ICAS president Rick Nadeau.

According to Transport Canada, pilots who wish to fly in air shows in Canada must now take part in the ACE program. The program will be administered by ICAS with Transport Canada, who provide regulatory oversight in Canada consistent with the existing FAA program.

All ACE documentation is available in both French and English. For additional information, contact ICAS at (517) 782-2424.

FLIGHT RESTRICTIONS NEAR PRESIDENTIAL APPEARANCES

The British call the events we're about to experience "taking to the Hustings," but here in the U.S., it's Election Year, with the capital letters denoting a Presidential election. We're quickly approaching the day when all of us eligible voters should head to the polls and exercise the right our foreparents have bequeathed us with their sweat and blood.

Some may be tempted to make some sort of an airborne statement when they know Presidential candidates are around, and some may just want to get a bird's eye view of the next occupant of the White House. So, now is a good time tc remind airmen of a little-known Federal Aviation Regulations (FAR)—FAR § 91.141, "Flight Restrictions in the Proximity of the Presidential and other Parties."

The entire regulation reads:

"No person may operate an aircraft over or in the vicinity of any areas to be visited or traveled by the President, Vice President, or other public figures contrary to the restrictions established by the Administrator and published in a Notice to Airmen (NOTAM)."

For mostly security reasons, candidates' itineraries are well-planned in advance, and restrictions would be published in NOTAM's. (All Presidential candidates, not just the incumbent President, receive U.S. Secret Service protection, and for the purposes of FAR § 91.141, could be considered "other public figures.")

So, check NOTAM's when you hear that a Presidential candidate is about to visit your city, town, or settlement, and make sure you steer clear of noncompliance with FAR § 91.141.

Besides, wouldn't you rather deal with the Friendly Aviation Agency than the U.S. Secret Service?

NEW PROFESSIONAL SOCIETY FOR AVIATION MAINTENANCE PROFESSIONALS

In response to an FAA challenge three years ago, aviation maintenance interests have formed the first professional society for certificated persons actively involved in aircraft maintenance. The International Society of Aviation Maintenance Professionals (ISAMP) has developed professional standards that apply industry-wide and will certificate members as professionals provided they continued to meet membership requirements.

Maintenance professionals who join the ISAMP pledge to certain obligations, including:

- **Continuing Education.**
- **Annual Fee.**
- **Standards of Ethical Conduct.**

Additional membership requirements include holding a certificate issued by the FAA under FAR Part 65 or an equivalent certificate from another country, holding the certificate for the past three years continuously, having a minimum of three years' experience actively engaged in the aviation maintenance professional, and having no FAA enforcement actions in the past three years.

For further information on ISAMP, contact its president, Christine A. Leonard, at ISAMP, 1008 Russell Lane, West Chester, PA 19382; (610) 399-9034, fax (610) 399-9035.

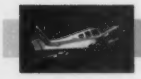
ATC ANNOUNCES NEW AIRCRAFT EQUIPMENT SUFFIX CODES

Because of the need to identify aircraft with emerging navigation systems on board, FAA Air Traffic has added new aircraft equipment codes for aircraft with Flight Management Systems (FMS) and Global Positioning Systems (GPS) on board as well as those with current Area Navigation (RNAV) systems installed. The new codes will identify to air traffic control (ATC) those aircraft with authorized navigation systems on board.

An operating transponder with Mode C is required to use the new codes. If an aircraft can not use its transponder with altitude encoding, it will revert to the appropriate code under area navigation.

Effective February 29, 1996, the new suffixes are R, G, F, and E. The codes are normally read and listed as slash (/) "code" such as /R, /G, /F, or /E, as appropriate, following the aircraft code on a flight plan.

Suffix /R (Area Navigation) is for those aircraft that are equipped with



systems such as OMEGA, LORAN-C, VERY LOW FREQUENCY (VLF), Inertial Navigational Systems (INS), and any combination of these systems with VOR/DME and or electronic landing systems;

Suffix /G (GPS/GNSS) is for those aircraft capable of navigating via oceanic, en route, and terminal phases of flight or, as they become available, those GPS systems certified to have the additional capability of navigating in the approach phase of flight. This use of Suffix G is closer to being in compliance with ICAO.

Suffix /F (FMS) is for those aircraft certified for IFR flight with a single flight management system with vertical navigational capability.

Suffix /E (FMS plus) is for those FMS aircraft with an electronic map and dual inertial reference units (IRU's) and dual FMS's.

Pilots need to review the February 29 issue of the *Aeronautical Information Manual* (AIM) for complete details and specific equipment and authorization requirements for using the new codes. The AIM has a revised list of all the equipment suffixes and how they are used.

ADVISORY CIRCULAR 20-5

AC 20-5, "Plane Sense," has been revised and copies are now available. Published by the Flight Standards Service, this AC is designed to provide the owner or prospective owner of an aircraft with some fundamental information on owning and operating a private aircraft.

Information includes tips on purchasing an aircraft, owner responsibilities, aircraft registration, maintenance, maintenance records, airworthiness directives, general aviation airworthiness alerts, and the service difficulty program. References to Federal Aviation Regulations are provided throughout the AC.

AC 20-5, "Plane Sense," may be ordered free of charge from: U.S. DOT Warehouse, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785. Facsimile requests can be sent to (301) 386-5394.

UND FLYING TEAM'S 3RD CONSECUTIVE NATIONAL CHAMPIONSHIP

University of North Dakota Photo

The University of North Dakota Flying Team defended its national title and scored its third consecutive win and its tenth win in 12 years at the 48th annual National Intercollegiate Flying Association (NIFA) Safety and Fight Evaluation Conference (SAFECON) this past May in Daytona Beach, FL. The team's coach, John Bridewell, is retiring after having taken six teams to the nationals and returning to Grand Forks with five national championships.

The annual, four-day NIFA championship this year involved 26 university and college flying teams and more than 200 student aviators. It was hosted this year by Embry-Riddle Aeronautical University, which came in third behind UND and Western Michigan Univesity. The championship places an emphasis on safety during nine different events that test a variety of aviation skills, both on the ground and in the air.

In the photo, above:
The 1996 NIFA Champions from the University of North Dakota are from left: Mike Galante (co-captain), Brian Jackson, Chris Van Ginkel, Joshua Kendrick, Mike Smieja, Larry Freer, Bill Bailey, Bob Shaw, Aleah Longshore, Susan Bailey, Shannon Bengeyfield, Juliana Stops, and Chris Farmer (co-captain).

METAR TAF

METAR Translation:

THIS IS A SPECIAL REPORT FOR WILEY POST AIRPORT IN OKLAHOMA CITY, OK ON THE 18TH DAY OF THE MONTH AT 20:20UTC, WINDS ARE FROM 250 DEGREES AT 20 KNOTS GUSTING TO 35 KNOTS, VISIBILITY IS 6 STATUTE MILES, IN THE VICINITY OF THE AIRPORT IS A FUNNEL CLOUD AND A THUNDERSTORM WITH HEAVY RAIN, AND HAIL, THE CEILING IS AT 2500 FEET WITH CUMULONIMBUS CLOUDS, TEMPERATURE IS 32 DEGREES CELSIUS AND THE DEWPOINT IS 24 DEGREES CELSIUS, THE ALTIMETER SETTING IS 29.98", THE FUNNEL CLOUD BEGAN AT 15 MINUTES PAST THE HOUR AND IS LOCATED WITHIN 5 TO 10 MILES OF THE AIRPORT TO THE SOUTHWEST, THE PEAK WIND WAS FROM 260 DEGREES AT 45 KNOTS 8 MINUTES PAST THE HOUR, THERE IS FREQUENT LIGHTNING IN CLOUD, CLOUD TO CLOUD AND CLOUD TO GROUND 5 MILES SOUTHWEST, THE THUNDERSTORM BEGAN AT 5 MINUTES PAST THE HOUR AND IS WITHIN 5 TO 10 MILES OF THE AIRPORT TO THE WEST AND IS MOVING TO THE NORTHEAST, THE HAIL STONES ARE 3/4" AND THE SIGNIFICANT CLOUDS OF CUMULONIMBUS MAMMATUS ARE OVERHEAD MOVING NORTHEAST

TAF Translation:

THIS IS THE TERMINAL AERODROME FORECAST FOR WILL ROGERS AIRPORT MADE ON THE 5TH DAY OF THE MONTH AT 11:30UTC, IT IS VALID FROM 12:00UTC ON THE 5TH UNTIL 12:00 UTC ON THE 6TH. THE TAF CALLS FOR, FROM 12:00UTC UNTIL 16:00UTC, WINDS FROM 140 DEGREES AT 8 KNOTS, 5 STATUTE MILES VISIBILITY WITH MIST AS THE OBSCURING PHENOMENA, BROKEN CEILING AT 3000 FEET. TEMPORARILY BETWEEN 13:00UTC AND 16:00UTC VISIBILITY WILL DECREASE TO 1 AND 1/2 STATUTE MILES DUE TO MIST. FROM 16:00UTC UNTIL 22:00UTC, WINDS WILL BE FROM 160 DEGREES AT 10 KNOTS, THERE WILL BE PLUS 6 STATUTE MILES VISIBILITY AND THE SKY WILL BE CLEAR OF CLOUDS. GRADUALLY BETWEEN 22:00UTC AND 24:00UTC THE WEATHER WILL BECOME, WINDS FROM 200 DEGREES AT 13 KNOTS GUSTING TO 20 KNOTS, 4 STATUTE MILES VISIBILITY WITH SHOWERS OF MODERATE RAIN, OVERCAST CEILING OF 2000 FEET, THERE IS A >30% BUT LESS THAN 50% PROBABILITY THAT BETWEEN 00:00UTC AND 06:00UTC THE VISIBILITY WILL BE 2 STATUTE MILES WITH THUNDERSTORMS AND MODERATE RAIN AND OVERCAST SKY AT 800 FEET WITH CUMULONIMBUS CLOUDS. GRADUALLY BETWEEN 06:00UTC AND 08:00UTC LASTING UNTIL AT LEAST 12:00UTC, THE WINDS WILL BE FROM 210 DEGREES AT 15 KNOTS, WITH GREATER THAN 6 MILES VISIBILITY, NO SIGNIFICANT WEATHER AND SCATTERED CLOUDS AT 4000 FEET.

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DO NOT DELAY -- CRITICAL TO FLIGHT SAFETY!

Mario Toscano Photo